THE ENGINEERING AND MINING JOURNAL.

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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

CONTENTS.

EDITORIALS :
The Great Exposition 461
Molly Maguireism. 461
Headquarters of the Institute of Mining Engineers, Philadelphia..... 462
Opening of the International Exposition. 462
Körting Gas Exhauster..... 464
Pacific Coast Notes 465
The Alchemists 465
Technical Education and Mechanical Training 466
Recent Hydraulic Experiments..... 467
Selected List of Patents..... 468
Mining Notes from Idaho, Arizona, Montanna, Utah, and Colorado..... 469
Notes..... 463 467
STATISTICS OF COAL PRODUCTION..... 470
COAL TRADE REVIEW 470
IRON MARKET REVIEW..... 472
METALS..... 473
FINANCIAL :
New York Stocks 473
Philadelphia Stocks..... 473
Copper Stocks 474
Gold and Silver Stocks..... 474
Gas Stocks..... 474

THE opening of the International Exhibition has claimed so large a portion of our space this week, that we have had to defer to our next number, the commencement of a series of articles, describing and illustrating the buildings and other engineering works connected with the Exhibition. The description of exhibits will be continued without interruption from this time forward to the close of the year.

THE Caribou Mine, Colo., we understand, is very shortly to be sold by the sheriff for some inconsiderable indebtedness. The mine is fully proven to be of great value, and has fine inprovements for carrying on successfully the exploitation and treating of the ores. It is worthy the prompt attention of capitalists. We regret having to defer this week also the publication of a correspondent's letter giving the history, the disgraceful history, of this property, and full details of the value of the ore, a large part of which runs $70 to the ton.

THE GREAT EXPOSITION.

THE tide of what may be called sentimentennial literature has reached its height already. Patriotism, poetry, music, waving banners, presidential eloquence, imperial silence, artillery, bells, sunshine, thunder, lightning, and rain have inaugurated the great Exposition ; and the newspaper reporters, turned loose in a fresh field, are mowing down the luxuriant items by the ton, and laying them to dry in long swaths, that is to say, columns. Doubtless the best things will remain to be gleaned afterwards. Just now, it is the fashion to attempt comprehensive surveys.

We cannot spend much time in swinging the scythe promiscuously. There is enough in those portions of the display at Philadelphia which concern the departments of industry and science especially represented by this Journal, to occupy us constantly ; and it will be our endeavor to present to our readers satisfactory accounts of the subjects, without wandering into the attractive outlying regions. We begin this week a series of articles from expert hands, which will be continued through the Summer, and the scope of which will be better understood from their contents than from any preliminary flourish of editorial announcement. Yet "a decent respect for the opinions of mankind" compels us to indulge in one or two general preliminary observations.

It is evident already that the Centennial Exhibition is to be successful beyonds the hopes of its friends, and to the great surprise of doubters and cavillers. If the latter class had given an earnest and cordial support from the beginning, success might have been more easily—it could hardly have been more completely—attained. We do not hesitate to say that in the elements of grandeur and beauty, as well as extent and substantial importance, the Philadelphia Exhibition surpasses that of Vienna, as Vienna surpassed all its predecessors. As to the accommodation of visitors, classification of exhibits, and other internal arrangements for convenience and order, there can be no doubt of the superior thoroughness and system of the American plan. This might have been expected, not only from the practical ability of the management, but also from the circumstance that all the lessons of former experience have been utilized in avoiding errors and overcoming difficulties in the present case. Moreover, the location itself offers material advantages both of beauty and of use, which have never before been combined in one spot chosen for such a purpose. It is also worth pointing out, that the effects produced are unprecedentedly great in proportion to the money expended. This appears at the outset, as our readers will discover when perusing the articles upon the subject in our columns, in the construction of the buildings themselves. Many of these are not merely monuments of taste, but also triumphs of economy in the skillful use of materials. Gratifying to the eye of the artist, they are still more attractive to the engineer.

The *Exhibition* has swallowed up the *Centennial*. The coincidence of dates dwindles down to the insignificance of an accident. If the United States were a hundred and one, or a thousand and one, years old, instead of an exact century, the splendor and importance of this exhibit would not be at all impaired. Its industrial value is independent, and far overshadows its historical associations. These constituted the occasion ; but the thing itself has outgrown the occasion. This is not to be regretted. When one gives a birth-day entertainment, nothing is more delightful than that, the greetings and congratulations being over, the guests should enjoy themselves so much as to forget the pretext of their assemblage.

When the Centennial celebration in its present form was proposed, the argument was advanced against it that a purely national anniversary was not a suitable time for an international festival. Whatever may have been the technical force of such an objection, no one will now be found to lament that it was overruled. The pleasure, pride, and profit to be derived from the sublime spectacle just inaugurated at Philadelphia are immeasurably superior to the petty satisfaction of national vanity which might have been obtained from a Fourth-of-July celebration, merely larger, longer, and endowed with more eloquence, bunting, and saltpeter than usual.

It is not the United States, but the world—not the first century of American Independence, but the nineteenth century of Christian civilization—that now unrolls on the banks of the Schuylkill its record of magnificent achievement. Not the independence of one nation, but the unity and progress of all nations is the inspiring theme. We are like one who goes upon a pilgrimage to some ancient battle-field, and lo! he cannot find the place ; trophies and graves alike are overspread with the golden harvests of peace.

Not only our enmity of a hundred years ago, but all more recent strifes are lost in this new enthusiasm. While bitterness still rankles in the heart, it is useless to say, "Let us forget." But in the presence of such a scene as this, it is unnecessary to say "Let us forget ;" for what we would forget, is forgotten already. Let us hope that the oblivion will be perpetual.

In no department of the Exhibition is the grandeur of the conquest of man over nature more instructively shown than in the various branches of engineering. Notwithstanding the prevailing depression, throughout this country and Europe, in those industries which chiefly employ the aid of scientific engineers, the exhibition in this line is so vast and comprehensive that if all other records and evidences in the world were instantly destroyed, it would be possible to trace the materials, methods, and achievements of the arts of mining, metallurgy, construction, artificial illumination, the utilization of fuel, and the designing and operation of machinery, and to reconstruct, in these respects, the history and the present condition of mankind.

There is one particular in which, more than in any other, unless we are greatly mistaken, the Philadelphia Exhibition will surpass all that have gone before it—namely, the extent and depth of the interest which it will arouse among the citizens of the nation in which it is held. Our people are to be its principal visitors. The number of foreigners will be small, though among them there will be a large proportion of intelligent students, commissioned to observe and report upon the arts and resources of the United States. But the eager minds of Americans will not let go this opportunity of unlimited advantage ; and we predict that our scattered population will furnish an attendance as great as has heretofore been obtained in similar cases from the densely settled States of the Old World, while the press will do its part both to maintain the interest and enforce the lessons of the Exhibition. *

MOLLY MAGUIREISM.

THERE is something implanted in the breast of every honest and brave man that turns with an irresistible and peculiar loathing from the cowardly crime of the professional assassin. We can make allowance for him who, in the heat of passion, takes the life of his fellow-being, and we can even think with leniency of the murderous acts of the pirate and brigand, who declare an open war on all the world, and, flaunting their black flag in the face of mankind at large, refuse to give or take quarter. But we find no language which can express our deep abhorrence for the cruel, cowardly, fiend who can, in cold blood, plan and skulkingly execute the death warrant of those who have in no way injured him, or who may even be his benefactors.

Having had considerable experience with the laboring classes in our mining regions, and having generally found even the rougher specimens, at bottom, right-minded and amenable to fair words, backed by honest acts, we long maintained that the horrible outrages in the coal regions, we have had such frequent occasion to record, were the isolated acts of ruffians, and not the decrees of an organized band of assassins. The confessions made some months ago by JAMES KERRIGAN, who turned State's evidence against his accomplices in a murder committed near Mauch Chunk, Pa., disabused us of this too favorable opinion ; but it remained for Detective MCPARLAN, a man of the most wonderful nerve and courage, to show us the almost incredible fact that there has, for long years, existed among our workmen at the mines, a regularly organized society or order, numbering, it is said, fully eight hundred members, in which murder and arson were deliberately planned and carried into execution by oath-bound members, chosen by lot for the special service.

We shall, on another occasion, give a full report of the evidence that is now being taken in the trial of "Molly Maguire" murderers at Pottsville, Pa. ; it exhibits a most alarming state of affairs in the coal regions, not so much from the fact that many men have been murdered there in the last few years, but because it has been possible for an organized band of many hundred desperate characters to commit murder and destroy property with almost absolute im-

punity during a number of years, and the efforts to bring them to justice have been rendered abortive by the passive, if not active, opposition to their discovery by the labor unions. It is more than probable that this disgraceful organization could long ago have been rooted up, or its very existence prevented by the Miners' Unions, which have been shown all-powerful when it came to be a question of inaugurating a strike. Surely the leaders are sufficiently intelligent to perceive that no greater misfortune could befall the class whose interests they claim to represent than to have it credited with conniving at, if not openly encouraging, the hideous deeds of the "Molly Maguires." It is quite within their province and ability to put a stop to this state of things by proper precept and by active co-operation in hunting down the perpetrators of the outrages, more or less heinous, that have become characteristic of the coal regions, and are particularly numerous during strikes.

A similar exhibition of "Molly Maguireism" was that which endangered the lives of thousands of our citizens by the explosion of dynamite at Bergen Tunnel, Jersey City, the night of the 6th inst. There is little doubt, unfortunately, that this was the act of the men on strike, and there are probably hundreds of those who could greatly assist the authorities in bringing the miscreants to punishment, yet they shield rather than expose them. How can it be otherwise than that the public generally should withhold all sympathy from the whole class of miners—the great majority of whom we know are worthy, honest men—when they find their leaders allowing, when they could prevent, these diabolical outrages?

HEADQUARTERS OF THE INSTITUTE OF MINING ENGINEERS, PHILADELPHIA.

THE rooms of the Centennial Committee of the American Institute of Mining Engineers, at 1123 Girard Street, Philadelphia, are now fairly in operation. Since May 1st they have been kept open from 9 A. M. to 10 P. M. each day, for the use of the members of the Institute and other visitors. The American Society of Civil Engineers have been tendered the entrée of these rooms, which they have accepted, and have reciprocated by extending a similar invitation to the members of the Institute of Mining Engineers with respect to their rooms in the Main Building in the Centennial Grounds. The rooms of the Mining Engineers are now well provided with geographical and geological maps, both of this and foreign countries, which are conveniently arranged for reference. The library already contains many of the more important State and United States geological reports, and, in addition, works on mining, photographs of various engineering works, etc. Files of several American and foreign scientific periodicals are also on hand, and their number will soon be increased by the addition of others. Although the Exhibition has not yet opened there have already been many visitors to the rooms, among whom were several foreign engineers, who purpose making visits to districts or works in which they are technically interested.

On Thursday evening, May 4th, there was an informal meeting held at the rooms, to which were invited such engineers and others interested in the Exhibition as were known to be in the city. The meeting was a very successful and pleasant one, there being nearly fifty in attendance. Among these were Sir REDMOND BARRY, Commissioner to the Exhibition from Victoria, Australia; AUG. MORRIS, Esq., Commissioner from New South Wales; Mr. J. DEBY, Belgian Commissioner; Mr. GUST. UHR; Mr. CARL DANIELSSON; Mr. AUG. LENHARDTSON of the Swedish Commission; WM. BRUGMANN, C. E., Representative from the Rhenish Prussia spiegel district; JOHN E. ICELY of the Swiss Commission; WM. SELLERS of Philadelphia; Prof. WM. P. BLAKE; Gen. W. W. WRIGHT; R. W. RAYMOND, United States Commissioner of Mining; A. L. HOLLEY, Esq.; JOHN BOGART, Esq., Chief Engineer of Parks, New York City, and Secretary of the Centennial Commission of the Society of Civil Engineers; JOSEPH M. WILSON, Engineer Centennial Buildings; JOHN A. WILSON, Engineer Pennsylvania Railroad; WM. MILNOR ROBERTS, Chief Engineer Northern Pacific Railroad; ROBERT BRIGGS, Editor of Franklin Institute Journal; E. B. COXE, J. S. ALEXANDER, and WM. S. NEILSON of Centennial Commission of American Institute of Mining Engineers; CHAS. E. EMERY, Esq; G. LEVERICH, Secretary of the American Society of Civil Engineers; Prof. E. T. COX, State Geologist of Indiana; JOHN B. PEARSE, Secretary of Geological Survey of Pennsylvania; J. D. ESTABROOK, Engineer of Fairmount Park, Philadelphia.

Prof. A. R. C. SELWYN, the Director of the Canada Geological Survey, had promised to give this evening some remarks on Canadian geology, but owing to a sudden illness he was unable to do so. The early part of the evening was spent in social conversation by those present until about 9 o'clock. Mr. E. B. COXE, in his capacity as Chairman of the Centennial Commission of American Institute of Mining Engineers called the assembly to order, and in a few remarks welcomed those present to the Institute Headquarters. He stated that it was proposed to make Thursday evening of each week a time for similar reunion during the Exhibition. He then introduced Mr. R. W. RAYMOND, who made some additional remarks as to the results which the Centennial Committee hoped to accomplish.

Mr. RAYMOND then stated that Sir REDMOND BARRY, the Commissioner to the Centennial Exhibition from Victoria, was present, and called upon him to address the company.

In response, Sir REDMOND said that he felt considerable diffidence in addressing those present, both from the fact that he had not expected to be called upon, and, also, because his knowledge of the subjects with which the gentlemen present were conversant was unfortunately confined to that portion which concerned the disagreeable legal difficulties in which mining affairs were too often involved. Having lived, however, many years in Victoria, he thought it would, perhaps, be interesting to speak of the marvelous changes which have taken place in that colony during the past twenty-five years. In 1853 the whole population of the colony was only about 70,000 souls. During that year gold was discovered in the colony and in a twelvemonth there were over 300,000 inhabitants. Having been, up to that time, an almost perfect wilderness, the mass of immigrants, on their arrival, found themselves reduced to the necessity of living in a most primeval manner, either in tents or rude huts, and with hardly any food except that derived from the immense flocks of cattle and sheep which roamed the country. He then spoke of the immense congregations of men at the various placer mining districts, ranging from twenty to sixty thousand souls while the gold working lasted. When these sources of supply were exhausted, successful efforts were made to find gold under basaltic masses of rock which at one time had flowed over and destroyed the beds of gold-bearing streams. By still deeper sinkings other basalt beds have been penetrated and other gold deposits found. At Ballarat three separate stratums of gold-bearing earth have been found in this manner inclosed between deposits of basalt. Some of the gold shafts at Stowell, a mining town nearer the coast than Ballarat, have reached a depth of over eighteen hundred feet, and are now below the level of the sea. Sir REDMOND then spoke of the foundation of a free public library at Melbourne in 1853, which now numbers over 86,000 volumes, almost all of which, he was glad to say, were of a substantial literary or scientific character He closed his remarks by thanking the committee for the kind reception which they had given him.

Mr. RAYMOND then remarked that what Sir REDMOND BARRY had just said with reference to gold mining in Australia would, with changes of the names of localities, apply almost exactly to the auriferous districts in our own country.

He then called on Mr. J. DEBY, Belgian Commissioner to the Exhibition, for some remarks on the Belgian mechanical and mining exhibits, but that gentleman excused himself on account of excessive fatigue, but promised at some future meeting to respond to the invitation. The rest of the evening was spent in social conversation. N.

OPENING OF THE INTERNATIONAL EXHIBITION OF 1876.

THE great Exhibition of 1876 opened on Wednesday last with great success. Early in the morning the prospect looked poor for fine weather, and even Old Probabilities seemed to be shirking the question as to whether it would be fine or not. By eight o'clock the rain had ceased, and alternate cloud and sunshine prevailed during the day. The notification given out the day before to exhibitors that their temporary passes would be good up to 9 A. M. for admission to the grounds, and also the notice to the general public that they would be admitted after that hour made the approaches to the buildings along Lancaster Avenue and Forty-first Street seem not unlike London during the yearly ride to the Derby in point of number and variety of passenger-carrying vehicles. The large number of turnstile entrances to the grounds, which were ready for entrance, allowed the rapidly-gathering crowds to get inside with but little delay and crowding; what little there was of the latter resulted principally from the fact that many had not provided themselves with the exact fifty cent note or silver piece with which alone they could gain admittance. Inside the grounds, in the immediate neighborhood of the Main Building and Machinery Hall, the improvements which have been wrought during the past twenty-four hours were strikingly apparent. The railroad tracks had been cleared of all cars and engines, the long unloading platform along the north side of the Main Building had been in great part removed, and the great heaps of empty packing-boxes which have so long been conspicuous have disappeared.

The asphalt pavements which, by heavy drayage, had been broken in places were hardly repaired before the gates were open for admission to the grounds. The large fine fountain which is to adorn the space between Machinery Hall and the Main Building has not yet been completed. The arrangements made for the accommodation of those who took part in the opening exercises were put up in the space between Memorial Hall and the Main Building. The platform for the President, Cabinet, Diplomatic Officers, Centennial Commissioners and other invited guests was ranged along in front of Memorial Hall, and on the north side of the Main Building and over the principal entrance was the stand for the accommodation of the THOMAS orchestra and chorus. The great organ which assisted the other music is immediately over this entrance. As rarely happens, on similar occasions, the programme originally laid down was strictly adhered to, and also commenced on time to the minute, the latter circumstance being happily characteristic of all the arrangements over which the Centennial authorities have had control.

At 10:15 A. M., when the exercises commenced, all the dignitaries, including the Emperor of Brazil, had arrived, with the exception of President GRANT, who was not put down to appear until later. The space between the two buildings was completely filled up with a closely packed, but orderly crowd, while more favored or adventurous individuals stood at the windows, or on the roofs of the buildings, or climbed the pedestals and bodies of the Pegasis which guard the entrance to the Art Gallery. The exercises commenced by the performance by the THOMAS orchestra of national airs of all countries, and they lasted so long that one felt grateful that there were no more countries provided with them. The President then arrived, and WAGNER'S Inauguration March was immediately played. Bishop SIMPSON then offered an opening prayer, and was followed by the rendering of WHITTIER'S Centennial Hymn by the chorus and orchestra. The buildings were then presented to the United States Centennial Commission by JOHN WELSH, President of the Centennial Board of Finance, and they were briefly accepted by Gen. HAWLEY. Next the cantata of SIDNEY LANIER was sung by the chorus, and included a solo by M. W. WHITNEY. Gen. HAWLEY then, in a short address, presented the Exhibition to the President, who, in accepting this honor, spoke of the results which it is to be hoped will be accomplished by bringing our nation into more intimate acquaintance with the other nations of the globe. He also spoke briefly of the great changes which the country has passed through in the last hundred years, and the progress which had been made in the arts and sciences; he hoped that an examination of the exhibits of foreign nations would inspire respect for their skill and taste, and that our own would be looked upon as a success. This closed the exercises on the grand stand, and the President and party went in procession to the Main Building, when, after traversing the grand aisle, the party passed through the west entrance across to the Machinery Hall. Going directly to the centre of the building, where the large Corliss engine is located, this was put in motion by the President, and after a short inspection of the buildings from this point of view, the party marched to the Judge's Building, where a reception was held. This terminated the formal opening of the Exhibition, and now let us review briefly what its general features are.

Two or three years ago, when the proper scope and character of the Exhibition was a matter of considerable discussion, many who favored the carrying out of the project of a Centennial Exhibition, contended that it should be purely national in character. It was argued that any attempt to have representative exhibits from foreign countries would end in failure, both from the great distance which separates us from most foreign countries and because these countries, from a variety of other reasons, one of the strongest of which is our system of protective tariffs, would consider it unprofitable to make such exhibits. Fortunately other counsels prevailed, a general invitation was extended to all countries to participate, the result of which is to be seen in the present displays from over forty different countries.

In some respects a number of these are more complete than the same countries have ever before made. In heavy machinery, particularly, not so much

could be expected from distant countries as was shown at Vienna and at Paris. Enough is, however, on exhibition to give a good idea of the quality and peculiarities of manufacturers of our foreign rivals, and whatever benefit our people may derive from their study we hope to be able to reciprocate by showing those who come over features peculiarly our own.

When one enters the Main Exhibition Building at either end, and looks down the long transept to the other extremity, the distance seems considerable. Walking the same distance before the exhibits were brought made it seem yet greater, and now that the goods are mostly in place, when one attempts to cursorily examine them, makes the distance seem interminable. For architectural effect no money has been wasted by the Commission, and, in consequence, there is no particular portion of the building, as at the Rotunda in the Vienna Main Building, which overshadows the rest in splendor. The transept trusses and towers in the center of the building serve, however, to break the monotony of the long parallel sheds which form the main structure of the building. With regard to the suitability of the building for the purpose of exhibitors, too much cannot be said in its praise. The light is abundant and most uniformly distributed throughout, giving but little choice with regard to the position of exhibits. Leaky roofs, which did so much mischief both at the Paris and Vienna Exhibitions, are not discoverable here. The unloading of goods and their bringing into place has been so skillfully provided for, that in spite of the almost universal tardiness of exhibitors, both American and foreign, the exhibits are, to-day, in a very creditable state of arrangement. Those who are not ready can in general lay the blame to themselves alone. In this Exhibition no attempt has been made, as at Paris, to arrange the exhibits of all nations so as to group like products together. In the United States sections, which, of course, form the largest exhibits, this has been attempted and with fairly successful results. The other nations have used their own discretion in the arrangement of theirs.

The United States occupy the southeast quarter of the Main Building and nearly half of the extreme northwest quarter. The remaining portion is occupied by the foreign governments, with the exception of the second story rooms over and each side of the west entrance, where the exhibits of the American Society of Civil Engineers and the Inventors' Benevolent and Protective Association are placed.

The remaining portion of the building is given up to the foreign countries for their exhibits, nearly every one of which has a frontage on the main aisle, which runs through the building from east to west. These spaces are so allotted that the four great countries, the United States, France, Germany, and England, adjoin each other along the grand cross aisle, which runs through the central transept portion of the building, as well as along the main aisle at right angles to it. Where these two aisles intersect, has been left a circular open space, immediately in the center of the building, and on the edge of each quarter of this circle, the four countries above mentioned have made as rich displays as possible. The long main aisle being naturally the most conspicuous and largely thronged portion of the building, each country has endeavored to have its display on it of as attractive a character as possible, and where they have been unable to complete other portions in time for the opening, they have worked to do so for this at least. In consequence, when the Presidential party passed along this aisle to-day, but one space, that of Turkey and Russia, was conspicuous by its emptiness. A walk along the back aisles of some of the foreign countries shows, however, that much remains to be done before all the exhibits will be ready.

For the convenience of the public, and for the profit of the Commission, large marble soda water fountains have been erected at various points along the main passages. Returning to the United States Exhibits, we find the east central portion of the building occupied by the manufactures of all kinds of cotton and woolen cloths, knit goods, carpets, linens, etc. Along the adjoining southern side of the building are concentrated the book sellers' displays, and so much have they been increased beyond their original limit that they now occupy the second, as well as the ground, floors of the interior buildings, which have been put up lately. Specimens of the pottery wares made in this country are also in this portion of the building. Immediately opposite, on the north side, are some exhibits of tile brick and terra-cotta ware. Succeeding the display of cotton and woolen goods, as we walk west down the center of the building, are the displays of the various fire arms and field artillery manufactures. Many of these, from their elaborate finish and arrangement, are very attractive in appearance. Then come displays of finished hardware and edge tools, surgical instruments, and siderurgical apparatus, gas chandeliers, and silverware, which extend along the left hand side of the main aisle to the center of the building.

The thousand and one articles which serve for domestic use or enjoyment are scattered through the south central portion of the United States section. The displays of the various manufacturing chemists adjoin on the transept aisle the similar one of the German Government. This department of exhibit is a very striking one, and if the displays of salts, solutions, and colors are as good as they look, we can well be proud of them.

Mining and Metallurgy.—Coming last to the department of Mining and Metallurgy we find it, in some respects quite complete, while in others it is not at all so. Two weeks ago the prospects for a good exhibit of iron and steel did not seem very good, but since that time a great change has taken place. Several of the BESSEMER and SIEMEN-MARTIN steel makers have put in quite complete displays of their raw and finished products notable among which are those of the TROY, JOHNSTOWN, EDGAR THOMPSON, and OTIS Works. Pig and wrought iron displays are made by quite a number of companies.

Of the other base metals, lead, copper, zinc, and nickel, there are a few exhibits. The Mining machinery is principally in the Government Building. The collections of State and private mineral exhibits have been forced by over-crowding of the Main Building into two annexes which adjoin the Metallurgical exhibits.

These buildings have quite recently been finished, and were so incompletely filled up to-day, that they were not opened to the public. Some weeks will be necessary before every thing in this department will be ready. Among the exhibits of foreign countries, those which are of interest to the readers of this Journal will be fully described hereafter.

England, in her colonies, has some very complete and interesting collections of mineral and metallurgical products. Canada sends coal sections, large masses of graphites, crystals of apatite, which are mined for making superphosphates, and some iron and iron-ores, marbles, etc. Australia has separate exhibits from Victoria, New South Wales, and Queensland. New South Wales sends sections of four of her principal coal veins, and a large series of photographs, showing the features of the country, from a geological point of view. Victoria has a gilded model, showing the amount and value of the gold which has been mined there since 1853. Queensland sends large quantities of copper and tin ingots, and, in illustration of the geology of the country, there is a very complete series of oil paintings of various districts. Sweden makes a splendid display of Bessemer steel, from two of its principal makers, and a collective display of its various iron-making establishments. Norway has but a single iron representative.

The rooms of the Association of Civil Engineers are being filled up with a very valuable collection of drawings and models, many of which relate to metallurgy and metallurgical operations.

Machinery Hall, which seemed a few weeks ago to be in a very backward condition, now makes a display which, for general completeness, surpasses that of any of the other buildings. The space occupied by the foreign countries being comparatively small, does not seem as though much work was left to be done; boxes have almost entirely disappeared, and all the passage ways are cleared up. The great Corliss engine, which moves nearly all the shafting, was running at full speed. Enough of the machinery was in motion to make the general din deafening, and attract large crowds to see their different operations. Looking through this building we see, in one respect, a notable difference from the corresponding displays at Paris and Vienna, in the general absence of heavy machinery and products. The display of locomotives, when this comparison is made, is very small. The large Corliss engine and a blowing engine made by I. P. MORRIS, a colliery winding engine with double cone drum, and a few other engines—all of which will be described hereafter—are the only large specimens of stationary engines on exhibition. Marine engines are almost entirely unrepresented. In the Pump Annex several large centrifugal and rotary pumps are in operation. The display of small machinery is a splendid one, and for variety and ingenuity of design far surpasses any that has ever before been made. This being the case, it is not much to be regretted that the show of large but not more useful machinery is limited. The east end of this building is given up to the displays of the foreign governments, England, Germany, and France having the principal spaces.

England has her exhibit in the most forward condition. BROWN and CAMMEL of Sheffield, have each specimens of their rolled armor plate, the maximum thickness of that shown by the former being fourteen inches, and by the latter twenty-two inches. A large sugar mill, made in Glasgow, is the heaviest piece of machinery in the English exhibit. Germany is not at all ready, and will principally be made up of KRUPP's display. Belgium has one of the best of the foreign shows; it is very nearly finished.

A complete set of the working apparatus for sinking shafts by the Chandron process, is the most prominent exhibit in the Belgian collection. A collection from Stockholm, of mechanical apparatus for developing the muscles of the human body, attract much attention from its novelty.

There is at this Exhibition a more complete collection of continuous WEB printing presses than has ever been shown. The WALTER'S, of London, and the BULLOCK and HOE of this country, will all have their machines in operation. The steel makers are also represented in this building, by displays of large forgings, tyres, etc. One large propeller shaft, made by JOHN ROACH & SON, is placed near the Corliss engine. The rock drill companies are out and in force, and are preparing to show their practical efficiency. Several coal-cutting machines are on exhibition. The large Government Buildings contain several of the most important collections which will be exhibited. The general display of minerals from all parts of the country is already a magnificent one, the coal sections being very prominent. Of the hundred other buildings which are scattered around the grounds, many contain things which will be of interest.

Having thus given a general, or bird's-eye, view, as it were, of the good things in store for the readers of this JOURNAL, our future articles will take up in detail the several subjects, and will place on record such information as may seem to be of practical value to the important industries we represent. N.

MANGANESE PROPERTY FOR SALE.—See advertisement in another column.

IS THE BIG BONANZA GIVING OUT?—See our San Francisco stock report on another page.

SHAFT SINKING MACHINERY.—From Colorado we hear that "the experiment of sinking circular shafts by a comparatively new method is said to have resulted satisfactorily. A cutting machine, traveling on a circular track, cuts a ring one to one and a-half inches wide, and twenty inches deep in the soil or rock. A hole is sunk in the center and charged when the machine is removed and the blast fired, shattering the core to atoms."

ON GOLD HILL, COLORADO a new mine produces ore at ten feet from surface which assays at $34 to $400 to the ton. By the old methods of treatment the product would not be half so large. The veins generally widen as greater depths are attained, which leads sanguine owners to the belief that bonanzas exist in abundance further down. The deepest shaft in the Territory is 1,000 feet, and the rule of gradual widening has thus far held good. Many of the ores contain tellurium, a metal that takes rank much above gold in point of value, but is governed by no fixed standard.—*Exchange.*

THE LIGHTNING AMALGAMATOR.—This is the name of a new process for crushing and treating all kinds of ores, full up to the assay, and at equitable prices. The whole apparatus is very simple. Broken rock of about the size of a turkey egg is put into a crusher not larger than an ordinary piano, and from 10 to 25 tons is pulverized as fine as flour daily. A larger crusher, of course, performs more work. One man only is employed about the entire crushing, from the time it is dumped until required for the furnace.

This consists of a cast-iron column or cylinder from 18 to 20 feet high. It is divided into three compartments equi-distant from each other by valves worked with a lever. Around this upright cylinder there is built a brick inclosure with an aperture sufficiently large to admit of a blaze from bottom to top. A charge of ore is placed in the top compartment of the cylinder, and after remaining five minutes, the first valve is turned and the charge drops in the compartment below; there it meets with a stronger heat and volatilized quicksilver. Ten minutes in this and it is dropped in the next lower compartment, where it is subjected to a white heat and dropped to the bottom to cool. Being thoroughly impregnated with quicksilver it goes to the amalgamating pans, and in four hours comes out bullion. The quicksilver is supplied from a chamber at the foot of the third compartment, and opposite to the furnace which supplies the heat. By the use of the valves the quicksilver is all or nearly all saved.

It is said that the entire outfit, as above described, with privilege to work it, will not exceed $6,000. Ponderous machinery, batteries, and concomitant expensive buildings and employees are curtailed, saving almost five-sixths of the present cost. The patent for this invention was issued about one year ago, but improvements have been made and defects pointed out which establish its utility beyond question. The different ores from Virginia and North Carolina mines are being tried every day with success. Ores that would only yield from $7 to $10 per ton heretofore, are by this method increased to $20 and $22. It is owned by the foundrymen, WALKER & Co., of Philadelphia, and was discovered by the scientific representative of that firm. The expense per ton is not expected to exceed $1.50, and they guarantee to get the full assay, and in no event to fall below five per cent.

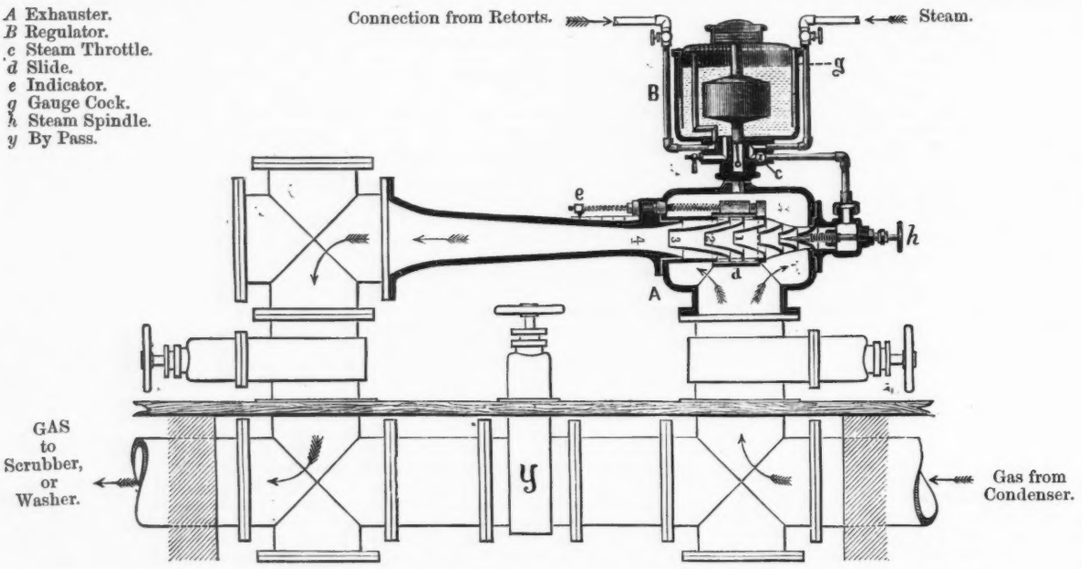
THE KÖRTING GAS EXHAUSTER.

Manufactured by Messrs. Schutte and Goering, Philadelphia.

We give in the following cuts and description, the arrangement of the "Körting" Gas Exhauster with the Clelland condenser and scrubber. Great efficiency and simplicity are claimed for this arrangement; it is in successful operation in this country and has found, we understand, a very extended application in England.

In a former number of this Journal we noticed the peculiar construction of the Exhauster, and give now the complete combination of the Automatic Governor with the Exhauster together, with the arrangement of the condenser and scrubber, by which the gas is made self-scrubbing.

A Exhauster.
B Regulator.
c Steam Throttle.
d Slide.
e Indicator.
g Gauge Cock.
h Steam Spindle.
y By Pass.



In the Steam Jet Gas Exhauster, as illustrated above, the inducing current is a Steam Jet, the quantity of which is controlled by a spindle H in the steam nozzle and the induced current of the gas to be exhausted is formed in a series of nozzles of increasing area. The purpose of these nozzles is to regulate the admission and proper mixture of the inducing and induced currents in such proportions as not to lose power by sudden shocks. In the use of the exhauster for gas works the quantity of delivery must be variable, while all the other conditions remain the same. Thus, supposing the difference of gas consumption in winter and summer to be, say four to one, in each case the counter-pressure of the washers, purifiers, etc., remains the same.

This regulation of the gas admission is accomplished in the following manner:—The inlets to the last three mixing nozzles are closed by a slide *d*, so that in the position of the slide, as shown in the cut, the last admission of gas is through nozzle 1, which in this case constitutes the size of the instrument, and the gas admitted up to 1 is from there discharged through the remaining nozzles, the same as if they were a continuation of the diverging tube. By forcing the slide towards the delivery end of the instrument so as to admit gas successively through 2, 3, and 4, by uncovering the inlets into these nozzles, the capacity can be increased corresponding to the area of their nozzles, all other conditions remaining the same, except a proportionate increase or decrease of steam admission by means of the self-acting governor B acting on a throttle *c* in the steam pipe.

The principle involved in this Exhauster and its peculiar construction of regulation, is not only said to require less steam than is used to develop a corresponding power in other machinery for the same purpose, and of the same capacity, but it is also claimed that the mixture of the small quantity of steam with the gas quickens and improves the after cleaning and scrubbing of the gas.

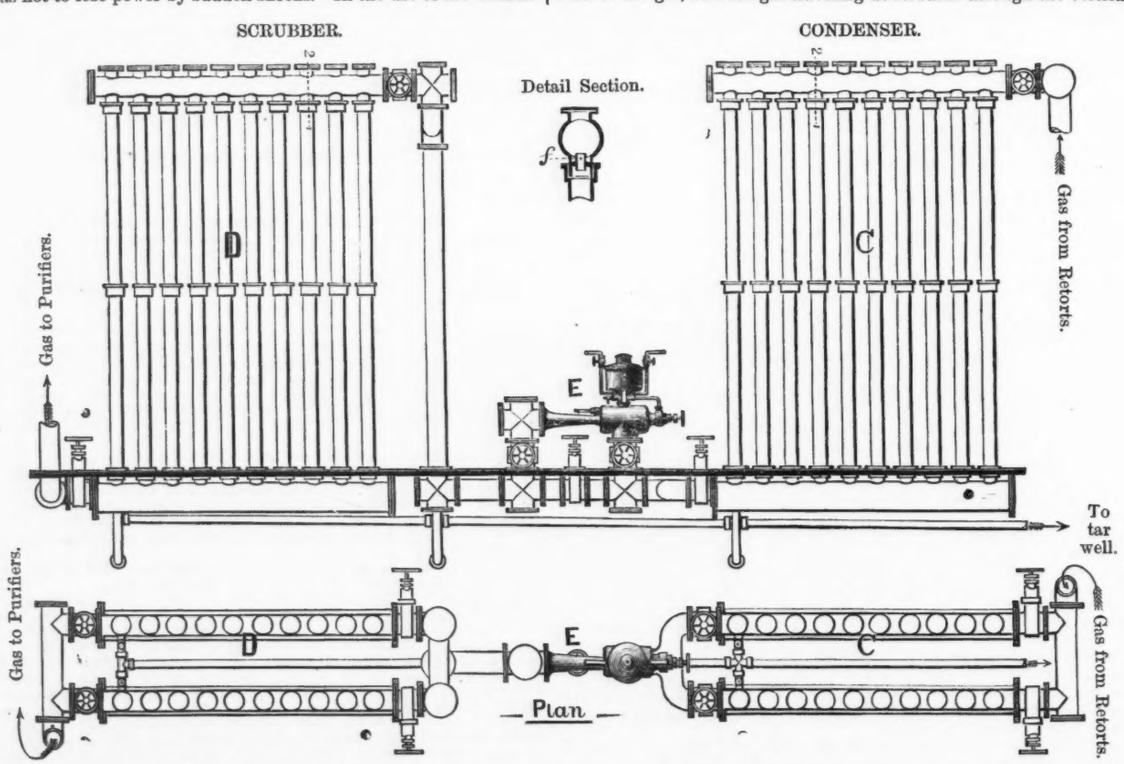
The Condenser and Scrubber, as represented in this illustration consist of two rows of upright pipes through both of which the gas travels *downwards*, drawn through the Condenser and forced through the Scrubber. The vertical pipes of the Condenser are empty, but those of the Scrubber filled with pine wood shavings.

As the warm gas enters the pipes at the top and passes slowly downwards, the formation of liquor takes place on the upper part of the interior surfaces. While trickling down in thin streams through the pipes, it continually acts on the slowly moving gas till it reaches the bottom, when the ammoniacal liquor is found to have acquired a strength of 6° to 10° Twaddle, or 12 to 20 ounces. Thus the gas is made self-scrubbing to a much greater degree than in the ordinary process.

After the gas has passed the Condenser C, which acts as a first or foul Scrubber it is forced by the Exhauster through the Scrubber D, mixed with the steam which actuates the Exhauster. This mixing with steam is highly beneficial to the gas, and the gas traveling downwards through the vertical pipes of the Scrubber D, (filled with wood shavings) finds an excellent cooling surface, and the absorbing material in the moisture trickling downwards—and it is in this way fully deprived of its remaining impurities.

As a general rule, if the Condenser and Scrubber be of the proper size, the temperature of the gas will be always the same and even, for all practical purposes—but if a further exactness in temperature is desired, the water jet in the discharge pipe will attain it with little expense.

The upper horizontal pipes from which the vertical pipes lead downwards,



are fitted with a ferule or throttle each, the tops of which are set at a level with each other, so that the liquor which accumulates in the upper horizontal pipes overflows these ferules or throttles, each in equal quantities, so as to supply to each vertical pipe an even quantity of the absorbing medium. (See detail section.)

PACIFIC COAST NOTES.

Special Correspondence of the Engineering and Mining Journal.

In the early part of last week mining stocks fell rapidly in price, and to the urgent sales made by margin-brokers for "more mud," the responses were not always metallic. Many of the small operators have lost their all, and the scheming "bears" who have gathered in the spoils are jubilant, only as successful raiders can be. There was a controversy, through the newspapers, between one of the bonanza owners and a bearish broker, which, to say the least, was a very foolish proceeding, unless, indeed, as some affirm, it was inaugurated with the design of making a break in prices. Just at the time this stock-gambling foray was in progress, the corner-stone of the Brokers' Exchange building was placed in position, and a lawyer consecrated the enterprise by speaking grandly of the honor and integrity which ought to characterize the actions of business men. There has been no change in the condition of the Comstock Mines to justify a sudden decline in values, but there are causes at work which will, certainly, make prices lower the next six months than they are even now. A large sum of money must be withdrawn to move our immense grain crop; many heavy stock dealers will visit Philadelphia and let stocks take care of themselves; and further, seven-tenths of the mines dealt in are not worth the prices they bring, and must go down when the bolstering-up process begins to fail.

MINES IN SOUTH AFRICA.

I met recently with an intelligent miner and prospector, whom I knew ten years ago. Since then he has spent five years in South Africa, as superintendent of certain gold mines, owned by an English mining company. In his explorations of that country he found gold-bearing quartz over an extent of territory measuring 1,000 by 1,500 miles, and came upon ancient mining works, which led him to suppose that he had reached King Solomon's Ophir. The openings on the lodes seemed to have been made by using fire to heat the quartz, and water to promote disintegration. With such a poor mode of working, it was not surprising to learn that the deepest opening was only 60 feet down. In the vicinity of the mines heavy slabs of hard greenstone were noticed, in which bowl-like hollows had been cut, and corresponding stones to fit into these openings, to grind the quartz, were also found. Earthenware gold-washing pans were discovered, but no evidence was obtained to indicate the kinds of mining tools that had been used.

CHINESE MINERS.

For some kinds of light work the Chinaman is well adapted, but in underground mining he is anything but profitable to his employer. His tendency to idleness, when out of sight, and his liking for candles that cost him nothing, make it necessary to watch him closely, otherwise he will spend much of the day in silent darkness. The Comstock Mines would cease, in a great measure, to be productive, if no other than Chinese labor were available. Useful as these people are for some kinds of work, the universal conviction of all who have been brought into contact with them, as their numbers increase, is, that they must inevitably ruin any country where they are permitted to crowd the white laborer to the wall. If California is not relieved of her Asiatic scourge, one of the greatest States of the Union will be injured for all time.

PROMISING MINES.

The mines of Ward district, sixty-five miles southeast of White Pine, Nevada, are attracting considerable attention. The Paymaster lode has been opened to the depth of 160 feet, and shows 10 to 12 feet of good pay ore. All the working expenses have been met during the past year by shipping selected ore to this city, a distance of nine hundred miles by rail, and one hundred by wagon. There are large amounts of low-grade ore waiting the advent of a stamp-mill. In future years the Ward district mines are sure to be well-known over all the land.

LET IT ALONE.

The mining act approved May 10th, 1872, is a very good measure, but every year some tinkering fellow wants to improve it. The recent proposal to change its terms by allowing persons who ought to do assessment work to pay a given sum into the school fund of the county in which the mines are located, and so leave the claims undistinguished by labor signs, can do no good to the miner, and may do great harm. Why will not our law makers let this really good act of Congress remain as it is? It looks as if the presence of Mr. Sutro in Washington was sure to bring about dangerous mining legislation. May we be set free from all "Sutrocius" schemes, this one among the rest.

A GREAT QUICKSILVER MINE.

I have recently obtained reliable information in regard to developments in the Mount Jackson Cinnabar Mine, in Sonoma County of this State, which convinces me that it has a great future. In one level 150 feet below the surface it has a width of 26 feet of ore, which assays 7½ per cent., and on another level, 3 feet of 20 per cent. ore. The lode is from 100 to 175 feet in width, and shows almost inexhaustible quantities of one to two per cent. ore. It is stated that quicksilver can be produced from the mine at an actual cost of less than 15 cents per pound.

NEW MINES.

An important mining discovery has just been made in San Bernardino County of this State. Large bodies of rich argentiferous galena have been found in a locality where wood, water, and climate are all that could be desired. An organization of the Resting Spring District has been the result, and as some of the discoverers are acquainted with the Eureka smelting ores, their favorable opinion of the new mines is a good practical endorsement of their value.

COPPER REDUCTION.

The Mindeleff works were visited this afternoon by a number of mining operators to see the work of copper production actually set agoing. In so far as the casting of ingots was concerned the undertaking seemed to be successful, but I regret to say that the supply of ore on hand is too small to keep the furnaces in operation more than a week. I hope the Mindeleff and Fryer processes will both succeed. The real test, as every one knows, is not in a successful start on a small scale, but continuous and profitable working for months at a time.

ADVANCE OF THE SEASON.

The summer winds have not begun to blow here yet, and hence the weather is delightful. All the hills are carpeted with flowers, and pine and blue gum trees, by exhibiting new shoots two feet in length, show that our season is well advanced. For some days past we have had nice new potatoes larger than hen eggs on hotel tables, and strawberries are retailing at 15 cents a pound.

San Francisco, May 2d, 1876. J. D. Emersley.

THE ALCHEMISTS.*

By George Asmus, New York.

Continued from page 443.

The apparent absurdity of buying from a man the art of making gold is explained, when we think that a great many preparations and years of constant work were thought necessary for success. It seems that only princes could afford to pay for all the demands of such laboratories; enormous sums were thrown away by them; and many even worked themselves Clever enough was Pope Leo; an alchemist had dedicated to him a poem, and the Pope gave him in return an empty bag, with the remark, that a man of his knowledge could not possibly have another want but that of a bag to put his treasures in. Some of the adepts are said to have become very rich, so at least assert the alchemists themselves. It is related that Raimundus Lullus, in the thirteenth century, made the gold for six millions of rose-nobles for King Edward III. of England. The money was to be used for a crusade, to which Lullus had persuaded the king. But the latter did not keep his word and spent the money in the war with France. In the fourteenth century Nicolaus Flammel gained enormous riches. He bought in 1357, at Paris, for little money, a manuscript written on a piece of bark, and worked for twenty-two years in vain, to decipher it; he traveled to Spain, where a learned doctor explained the hieroglyphics. It was written by a Jew—Abraham—who had directed it to his tribe, explaining the process of making the Philosopher's Stone. Both men went together to France, but the doctor died during the journey. Flammel succeeded, in 1382, in changing quicksilver into gold or silver, at pleasure. He founded fourteen hospitals and many churches. Up to the year 1742, charities, founded by him, were distributed at Paris; but the numerous investigations—to find how Flammel had obtained his vast fortune—gave no results; and those which were obtained by the king, during Flammel's lifetime, have not been made public.

George Ripley, an Englishman, is said to have manufactured 100,000 lb. of gold, and to have sent them to Rhodes for the benefit of the Order of the Knights of St. John. This was in the fifteenth century. 8,400 lb. of gold and 6,000 lb. of silver, which were found in the treasury of Emperor Rudolph II., and 17,000,000 ricksthalers, found after the death of the Elector Augustus of Saxony (1586), were considered alchemistic products, as both these princes had been great protectors of the secret science and had personally done much work in that direction.

The Arabic adepts of alchemy had been, almost exclusively, Doctors of Medicine. In France, Germany, Italy, and England, almost all alchemists belonged to the clergy. From the ninth to the fifteenth century hardly one alchemist of consequence existed who did not belong to the Church. In the fourteenth century the art began to become common property, and, in spite of numerous edicts from pious and profane hands, we find citizens, merchants, noblemen, princes, bishops, and Popes at the retorts; and poets lauded, in elegant verse, the bewildering art. In the sixteenth and seventeenth centuries, especially the traveling alchemists, scientific tramps, play an important part. They lingered mainly about courts, princes, and high priests, but often enough paid for the empty promise—to fill the treasuries with cheap gold—very dearly. It was about this time that societies were organized to unravel the secrets of the alchemists, and prominent among these was the Society of the Rosicrucians, which flourished till the middle of the eighteenth century. Quite a number of other societies were founded, but none had any success. They found their occupation, on the contrary, rather dangerous for their own members, as alchemy itself was forbidden by law.

From the twelfth to the sixteenth century the Philosopher's Stone caused many a difficult lawsuit. Although the courts punished the *practice* of the secret art in law, they accepted fully its efficiency. The question, whether artificial gold, though not distinguishable by test from the natural metal, had the same value as the latter, was denied by some jurists, because, they argued, it was not certain that the alchemistic gold had *all* the innate qualities of the natural stuff. The lawyers of Leipzig declared repeatedly the existence of the "Stone." For instance: David Beuther, the alchemist of the Elector August of Saxony, was condemned, 1580, because he had cheated his associates and partners in the secret in regard to the Stone, and also the Elector; Beuther was to be put upon the rack; he was to be whipped because he had betrayed his master; but for cheating his partners, two of his fingers were to be cut off, and the man himself was to be kept in prison, the latter for the benefit of the country, lest he might tell the secret to other potentates. Even as late as the year 1725, the Juridical Faculty of Leipzig gave a verdict, which is quite interesting, because it shows how absolute the belief in alchemy was. The Countess Anna Sophie von Erbach had given protection, at her castle Frankenstein, to a persecuted poacher. The fellow, who was an adept, transmuted, out of gratitude, all the plate of thecountess into gold. Her husband, Count Frederick Carl, claimed half the treasure, because the increase of value had taken place upon his dominion and in wedlock. He lost the suit, because the object in dispute had been the absolute property of the Countess before the transmutation; the latter could not change the ownership. .

Amongst the high patrons, an abundance of whom alchemy always had to boast of, was Sultan Kalid, who reigned in the twelfth century in Egypt under the supremacy of the Caliphate of Bagdad. He assembled a great number of adepts, and is known as the author of quite a number of alchemistic writings. King Alphonse of Castile (died 1284) wrote alchemistic essays, and King Henry VI. of England was much inclined to the art. He asked, in different decrees, noblemen, doctors, professors, and clergymen to study alchemy earnestly, that he might be able to pay the public debt. Especially the clergymen, he said, ought to study the secret of making the Philosopher's Stone; for them it was so easy to transform bread and wine into flesh and blood, that they ought to find no difficulty in transubstantiating common metal into gold!

The clergy got angry at this insinuation; they saw in it an attack upon religion, but men of all stations tried to satisfy the gracious king. In fact, a charter

*A paper read before the American Institute of Mining Engineers, at the Washington Meeting, February, 1876.

was given to a company which filled the empty treasury with gold. But it was all metallic counterfeit, which, perhaps, explains the care taken to foist the spurious coins upon the neighboring countries. Most likely it was amalgam of copper that was given for gold. This alloy, if well burnished, becomes yellow, can be stamped and melted, is tolerably heavy, and decomposes only in a high heat.

The Empress BARBARA, second spouse of the German Emperor SIGISMUND, was an ardent adept; she understood very well how to make silver by mixing copper with arsenic, and gold by smelting copper with silver, which alloys she sold to the common people for good silver and gold.

One of the principal protectors of the secret art was Emperor RUDOLF II. (1576-1612); almost all of his time was dedicated to the great purpose, and even his lowest servant was a laborant. His poet, MARDOCHÆUS, immortalized the alchemists, who came in contact with the Court of Prague.

AUGUST of Saxony had a laboratory at Dresden, and his wife had another at her favorite castle at Annaberg; the latter chemical kitchen is famous as the greatest and most luxurious that ever existed. Such cases might be multiplied without end. It was especially during the seventeenth century that many potentates tried to augment their finances through the aid of alchemy; but no case of success is reported. Emperor LEOPOLD I. made the Augustine Monk, WENZEL SEYLER, a Baron, because he had made tin into gold; the fraud was afterwards detected. Even FREDERICK the Great, who used to make fun of all alchemistic endeavors, is said to have been much taken by the same in the days of his youth.

There must have been a strange attraction in the vagabond life of the alchemist of the later centuries; the danger made it spicy. There is no doubt that all the alchemistic tramps have been liars, thieves, and humbugs, but they appear only after the art had left the quiet study, and had become the common property of everybody. The desire to play for a little while with the great tyrants of the earth, to walk about honored and esteemed at the courts—even for a few weeks—was so fascinating that the danger of being detected and punished most cruelly could not cool it down. But it appears just as strange that princes who had been cheated most clearly, and ever so often, would go into the trap again and again, finding no other satisfaction than in the consummation of the most terrible atrocities when the fraud was detected. It is plain enough that the position of the traveling doctors became more dangerous every day.

The first trial was mostly a clever trick on a small scale, which paid them well, if they could manage to get away quickly enough. But this was not so very easy; and after the time stipulated for as necessary for preparation had elapsed, they were either punished as impostors, or, under the presumption that they did not want to expose the secret, they fell into the merciless hands of the tormentor and hangman. For instance: in the year 1575 the Duke JULIUS of Brunswig-Luneburg condemned an alchemist woman, ANNA ZIEGLER, to be burned in an iron chair, because she had promised to make gold, and could not do it. A Count, MAMUGNANO, who had often escaped before, was hanged at Munich in the year 1590; and in 1597 the Duke FREDERICK of Wurtemberg ordered the alchemist HONAUER to be hung on iron gallows, because he had cheated him about the manufacture of gold.

Quite interesting and instructive is the fate of DON DOMINICO EMMANUEL CAETANO, CONTE DE RUGGIERO, though he was but the son of a peasant of Naples! First he worked hard as a mountebank; in 1695 he was in possession of his Philosopher's Stone, having become the favorite of MAXIMILIAN of Bavaria, who was at that time Governor-General of the Netherlands, residing at Brussels. Quickly the famous adept grew in importance; he became a field-marshal, chief of a regiment, and titular-commander of Munich. When he had reached this high station he was found out to be a cheat; he had to fly, and became court-alchemist of the Emperor LEOPOLD the First of Austria. After the death of his master he took service under the Elector JOHN WILLIAM of the Palatinate, who resided then at Prague. To this gentleman he promised to furnish in seven weeks the trifle of seventy-two million thalers of gold. But before the seven weeks had passed, he had disappeared with all the money advanced to him. After this we find him again at the Court of King FREDERICK I. of Prussia, father of FREDERICK the Great, where he worked for four years. It is not fully known what kind of success he had there, but this much is certain, that this gracious King gave orders, in 1709, to gild the man all over and to hang him, which was promptly done. Another, a real nobleman, HECTOR VON KLETTENBERG, was decapitated at Königstein, upon the request of AUGUST of Poland, in the year 1720.

Of more interest is the career of JOHN FREDERICK BÖTTCHER. He was an adept of great learning, but got into trouble with King AUGUST II. of Saxony, and was for a long time imprisoned at the mountain castle Königstein. It seems that he was allowed to work there; at any rate, he discovered, in 1709, the manufacture of chinaware, which art had been, up to that time, a secret known to the Chinese alone. This valuable invention gave him his freedom again, and he died an honored man, in 1719, as Director of the government porcelain manufactory.

If the traveling alchemists of those times, who tried their fortune with kings and princes, were badly off—not much better was the fate of quiet, honest men of learning who struggled *for truth*. Many of them became victims of envy and avidity—or they died, after they had sacrificed everything to their dreams, in miserable poverty, little knowing how grand a Phœnix should rise out of their ashes.

Like the glorious sun rose the discovery of *oxygen* on the horizon of our present day. Combustion, oxidation, had been a deep mystery all along; a mere word, linked to a vague apprehension, was the representative of one of the roots of most chemical actions, the *phlogiston*, it was called—the supposed principle of inflammability—the matter of fire in composition with other bodies. In 1774 CAVENDISH discovered oxygen, but it was ten years later that LAVOISIER made the proper use of the discovery, in showing that an increase of weight took place by oxydation, or combustion, and that absorption of oxygen was the cause of it. He became the founder of the antiphlogistic system, the correctness of which he soon proved by decomposing water, showing its elements. The noble head of the *Father of Chemistry* fell under the guillotine on the 8th of May, 1794, at Paris; he had been in the employ of the Government, and his over-consistent countrymen would not spare him!

I hope, gentlemen, you will find nothing strange, or perhaps ridiculous, in the behavior of the laborants of olden times. On the contrary, you will think kindly of them, if you keep in mind that they have done a great deal of good; that they tried to learn all that was known, but found darkness when hunting for light. And, after all, are we now so absolutely sure that our chemical *elements* are really such? Later centuries may perhaps smile about many of our present theories, just as we are inclined to do about those of our ancestors.

But so far as the humbugs are concerned, they have not died out yet. Adepts turn up every day; they discover new laws of nature, in medicine, in metallurgy, in mechanics, and even in the dim region of the ghosts.

Is it not terrible to see little children wither under the influence of patent drugs—the only effective ingredient of which is opium? Is it not sad to behold innocent and pious old maids falling into chronical tipsiness, in consequence of using arcana as stomach bitters, and the like? Is it not amazing to learn that tenacious phosphorus is cheated out of a furnace full of bad iron, by being somnambulized with a pinch of snuff? Is it not more than wonderful to be told by convinced eye-witnesses, that a piano danced with a fiddle about the ceiling—moved by the spirit of a baby? And, more than all that, is the famous Count DE RUGGIERO not a scientific gentleman in comparison to a KEELEY, who persuades a 4,000-ton ship across the ocean with cold steam, raised by the witchcraft of his lungs?

And all these find long and willing ears, and long and willing purses—exactly as the adepts of olden times.

The modern alchemists have, however, two great advantages over their brethren of old—they are alive, and in no danger of being hung.

TECHNICAL EDUCATION AND MECHANICAL TRAINING.

TO THE EDITOR: SIR—Apropos to the discussion of technical education, I submit the opinion that there should not be that wide difference of feeling and want of sympathy between the so-called practical man, and the so-called scientific man. Upon this point I think we are all agreed, but as to how we are to completely solve the problem of bringing them into closer brotherly understanding, I am sure we are not all agreed.

What is more discouraging to a man of sound sense and determined energy, than to know that he has men about him who are continually pulling in opposite directions? Yet how perfectly cognizant are we that such negativeness, if I may use the expression, does exist, and that, too, amongst the educated as well as the uneducated classes.

Want of harmony in thought and action is one of the great evils standing in the way of young men becoming good and efficient engineers.

It is impossible for one man to comprehend everything, yet the purely scientific man disregards many things in the construction and proportioning of parts, which the practical man will consider indispensable, not from any particular theory of his own, but from an innate sense of that which is correct. The why and the wherefore he may not be able to explain, yet in actual practice he is right.

These differences among sections of our profession, will grow less conspicuous with the advance of education, science, and art. And, however unconscious we may be of the fact, yet we are surely becoming more familiar with each other, just in proportion as we cultivate and interchange ideas with those with whom we are in daily contact, and who are mutually willing to profit by instruction.

I feel the good time is coming when the mass of mechanics and miners will be both scientific and practical in a very large sense.

Many of our teachers are not sufficiently practical, otherwise they would point out and explain, more fully than they do, many very scientific and mysterious phenomena, thus educating the mind of the student to recognize if not fully to comprehend them, and in this way, not only preparing him to theorize more correctly, but also enabling him to avoid laying himself open to the derision, which often follows in case the theorist is proved in error.

I agree with President HOLLEY, in his idea of establishing schools, and I venture to say the time is not far distant, when it will be the only good plan, by which a young man can obtain a thoroughly practical and theoretical knowledge.

The reasons are potent. Quoting from Mr. COXE: "The mechanics we have at present are often men who do not serve regular apprenticeships, or, if they do, work on at one or two nearly perfect machines." The time so spent on these "nearly perfect machines" is time not altogether thrown away, but *by no means* is the mechanic obtaining the good that every young man should be gaining, while spending the few years he is limited to in fitting himself for theoretical training.

The reading and understanding of drawings, and the surveying and comprehending of machinery may, perhaps, be compared to the studying and speaking of languages; and in order to illustrate what I wish to convey to the student, I will state that a mere theoretical engineer, will copy, or perhaps construct an elaborate machine on paper, in which full lines and dotted, right lines and circles, are as familiar to him as reading and writing. He can explain the minutest detail of the machine, and how it should go together, and how be taken apart, and he will branch off in true PATRICK HENRY enthusiasm into its working and worth, simply from having studied it while before him on the board; yet, place him beside the same machine as it stands completed, and he is bewildered. He can explain to you nothing, it may be, save the general construction, and his ideas of its practical construction are as clear as they would be on the compiling, setting the type, and binding of HOMER'S Iliad, all of which he may possibly have read, though he never knew absolutely how the work was put together.

On the other hand, show the aforesaid drawing to the hard-fisted mechanic, and it would be as unintelligible to him as Latin or Greek, for to him there is a confusion of many lines, worse than any German text; but place him with the machine itself and he feels at home, and will explain to you its construction, dissecting any part in a straightforward mechanical manner, provided the machine has been designed practically and with care.

The address of President HOLLEY, and the discussion on that address, which I saw in a recent issue of the ENGINEERING AND MINING JOURNAL, is of the deepest importance to every engineer and mechanic.

To this subject I would call the particular attention, not only of the young engineer, but also of those grown gray in the service of engineering, and who are now marking out a course for their successors.

I also agree with Mr. COXE, that you cannot, in schools, learn how to govern men. The faculty of governing rightly is one of the cardinal points of success; fail in it, and you have lost a stronghold in your profession. Some men have the peculiarity of always firing at their men a full charge of hot shot, preparatory to giving directions or instructions, and by the time the employer is ready to come to the point, the mechanic is so worked up, sometimes with fear, and sometimes with rage, that he is completely incapable of receiving either directions or instruction. The result is, the orders are disobeyed, the instruction unheeded, and the master wonders to himself if ever before there was such an irritable and heedless fellow.

I call to mind an experience I once had in Chicago, Ill., in which city I was putting in some heavy foundations for machinery, soon after the great fire. At that time, every man who could work was pressed into service; men were getting high wages, and were constantly striking for either higher figures, or fewer hours of labor. Hundreds of mechanics came from other cities, and circumstances conspired to make men arrogant and independent. Many of the men were rough characters, with whom it was necessary to deal firmly, otherwise they would not half work; and not only that, for had they had their own way a very bad example would have been set to those who were disposed to act fairly.

I soon found I had some half-dozen in my force, that were of the rough sort; one even went so far as to attempt to take my life. This attack so aroused my blood, that from that moment onward I never relaxed my will to show them, and the would-be murderer in particular, my determination not only to take the lead, but that they *must* and *should* follow my instructions. The result was, that long before I was through with that set of men, I could never lift my hand to do anything without their anticipating me, and of all the men I have since been in charge of, I can recall none that were more willing to do my bidding.

Always take the first lift yourself, not that you are bound to take it any more than the laborer whom you control, but by so doing you soon impress your men that to be appreciated they must be prompt, which is one of the main elements of success.

I want young engineers to think of what I have said, and try to treat their men as they themselves would wish to be treated. "Never be backward in coming forward," let your men see that you perfectly understand *yourself*. And here permit me to say, that it takes only a short time for a mechanic, or even a mere laborer, to make a thorough survey of his master, and if from your attitude, no less than from your speech, your employé forms an unfavorable impression, you will find yourself embarrassed at every turn.

Always make it a point to put your "shoulder to the wheel" first, and soon you will find that you have only to wish, and you are obeyed. I repeat it, don't irritate your men. A boy often receives a fair common-school education, and goes into a shop; but by the time his apprenticeship is over, and he is prepared, so far as practical knowledge is concerned, to enter a technical school, his fine sensibilities are blunted, if not gone entirely. In very rare instances will a boy be found who can commence his schooling again with the right enthusiasm.

A condition necessary for obtaining admission to a technical school should be a certain time spent in studying works of practical utility. This desideratum would bring to the school young men of greater determination than are at present to be found in those establishments.

Masters of shops and foundries would object to taking a boy in their employ without obliging him to stay a specified time. This term will certainly be long enough to enable a master to derive some benefit from the boy, to compensate the former for the bad and spoiled work of the latter. At the expiration of this period the boy will be so far developed that, should he choose to enter a technical school, he will be better fitted to imbibe those professional tenets which go to polish the engineer; and let the scholar ever bear in mind that the higher the polish the better will he withstand, in after years, the corrosive attacks necessarily incident to his career.

At all times it is a matter of serious consideration for one to choose the proper shops in which to place a boy, in order that he may have engrafted into his mind those thoroughly practical ideas which will serve him advantageously in the future.

One of the greatest evils that can befall a youth who has the ambition to become prominent in the engineering profession, is to be placed in contact with, to say nothing of being under the tutorage of, an impracticable man, one who is full to overflowing with little whims, who is slack in discipline, who is wanting in dignity, who is never prompt, and who is incapable of placing before his men a class of work which can be understood and appreciated by the public at large.

To procure for a boy, or young man, a thoroughly practical education, first make a close investigation as to the best shops in which to apprentice him. Then pick out the foreman mechanic, whose high qualifications have secured him his important position in the works; place your boy under his charge, and you may rest assured that when the boy has served his term of apprenticeship he will have received a far better knowledge of his trade than if he had been allowed to "paddle his own canoe," select a shop for himself, and serve a short apprenticeship, without having received any practical instruction.

Under proper supervision (this means a great deal) a boy will generally profit both himself and his employer. Reverse the case, and the young man will almost invariably turn out to be a miserable "botch," and a nuisance, wherever he may chance to be employed.

I should like to enlarge upon this theme of correct mechanical training, but this must suffice, earnestly counseling you who have sons whom you hope will become *g od* and prosperous engineers, to *look well* at the ground over which you propose to lay your double track, broad gauge road to fame, and don't plant a grade stake except you are perfectly sure it is not on a treacherous soil, underneath which there is quicksand, which will, in a short time, sink your road out of sight.

OROSCO C. WOOLSON.

CHICOPEE, Mass., April 27, 1876.

NOTES.

THE TENNESSEE COAL AND RAILROAD COMPANY mined and carried to market during 1875, 3,676,586 bushels of coal and coke, an increase of 916,768 bushels over the preceding year. The cost delivered at Cowan: 5 62 cents per bushel, as against 6·41 per bushel for the preceding year. There was realized 7·52 cents, as against 9·1 cents for the year 1874.

THE CO-OPERATIVE COAL COMPANY, near Webster, Pa., is making headway. Three thousand dollars are to be paid July 4. Much has been written concerning co-operation. It ought to be tested. If it works well, thousands could go into it. Coal lands are all about us and are to be had. Our labor societies would do a wise thing to help this company test what can be done. A subscription of $25 from a few societies would help much. Discuss the matter, and we will furnish information if required.—*Labor Tribune.*

MINING IN ALGIERS.—The ores extracted for the first six months in 1875 in Algiers comprised 293,000 tons of iron, 1,730 tons of copper, 1,452 tons of lead, and 540 tons of zinc, making a total of 296,722 tons, a quantity equal to about one-fifth of the total mining operations of France, which is valued at 7,000,000 frs. per annum. The Consul states that the Aures mountains teem with mineral wealth, which has yet to be developed. He visited them last year, and reports not a single European to be found there.

THE EMMA MINE HEIRESS.—The young lady after whom the famous Emma Mine is named is a boarding pupil at Miss GRANT'S finishing school for young ladies, in North Dearborn street, an aristocratic stone mansion, with an air of exclusive gentility about it. She is a tall blonde, with a satin-smooth, ivory-tinted skin, and light, wavy brown hair, which was coiled in a loose classic knot at the back. Her dress was a simple Marie Louise blue. A long scarf of black lace was tied about her throat. She was guiltless of the smallest piece of jewelry, and her long slender fingers were unadorned by a single ring. A soft fringe of curling hair outlined a low, wide brow. This was EMMA CHISHOLM, sole daughter of the house and heart of ROBT. BRUCE CHISHOLM, of Elgin, Ill., a few years ago half owner of the Emma Mine, now a retired capitalist. I explained my visit to Miss CHISHOLM, who laughed merrily and said:

"Well, I have always eluded an interview, and all those newspaper reports have been solicited from Papa and the boys. I found the notoriety of the mine unpleasant at first, but I do not mind it now. Three years ago I visited the mine, and enjoyed the trip very much, especially the ride from Salt Lake City to Alta, the little village at the mine. I found the miners enjoying a brand of cigars called 'The Little Emma,' and they actually had my picture on the box." The young lady laughed merrily at the recollection. She further added that she was only ten years old when her brother WILLIAM named the mine after her as a voluntary peace offering, as she was constantly importuning him to "come home to his dear Emma." She was born in Eastern Minnesota, May 6, 1859.—*Chicago Letter to the Graphic.*

RECENT HYDRAULIC EXPERIMENTS.

By Richard H. Buel.

IN the Summer of 1874, an extended series of experiments on the discharge of water through large openings in thin plates, was made at Holyoke, by T. G. ELLIS. An account of the manner of conducting the investigations, with tables of observations and results, forming the paper for which the Norman Medal of the American Society of Civil Engineers was awarded in 1875, appeared in the February number of the *Transactions* of that Society. In many respects it is a model engineering treatise, detailing clearly (with some few exceptions, to be noted hereafter) the apparatus and methods employed in making observations and computing results. It is proposed, in the present article, to give a summary of the results obtained by Mr. ELLIS, and to call attention to some conclusions which may be drawn from them. The experiments were made at one of the locks of the Holyoke Water Power Company, which was used by Mr. EMERSON for testing turbines. This lock was so arranged that water could be discharged, either from vertical or horizontal apertures, into a basin, at the lower end of which was a measuring weir. The basin was fitted with partitions, over and under which the water issuing from the apertures passed before reaching the weir, for the purpose of destroying the undulations. Mr. ELLIS also placed floating planks in the basin, for the same purpose. The weir was so arranged that its length could be changed as desired, by the use of stop planks. In the experiments, the length was varied from two to ten feet, the latter length leaving three feet on each side between the end of the weir and the side of the basin. Water was admitted to the lock by a submerged gate, regulated by a screw and gearing at the top. A bulkhead, pierced with holes, was placed a short distance back of the discharge aperture, for the purpose of equalizing any current that might exist—but it was found that the current was inappreciable, on account of the large area of the channel in proportion to the apertures. The apertures were formed in cast-iron plates, with planed faces and sharp edges, except the smaller square aperture, which was in a wrought-iron plate. The dimensions of the apertures are given in another part of this article.

Hook gauges were used to measure the depth on the weir, and the head of discharge up to five feet. For the depth on the weir, a perforated copper pipe was placed along the inside of the dam below the crest of the weir, and one end of this was connected with a rubber tube which passed through the planking of the dam, and communicated with a bucket, which could be raised or lowered at pleasure. By this arrangement the measurement could be made conveniently, in a good light. For the head of discharge, up to five feet, a similar rubber tube and bucket were employed, except that the tube was merely inserted into the bulk-head in which the discharge aperture was made. Heads above five feet were read on a scale attached to a glass tube. The standard employed for all the measurements was a 3-foot scale, made by DARLING, BROWN & SHARPS.

Experiments were first made to determine leakage, the aperture being closed, and the water being allowed to rise slowly, while heads in lock and depths on weir were noted, after which, tests of discharge through the different apertures took place. An attempt was made to measure the discharge at certain definite heads, but Mr. ELLIS states that it was found impossible to do this, on account of changes in the level of the canal. He, therefore, made the observations when the head was as nearly stationary as possible, but when it was still rising, as in this way he would be most likely to obtain readings when the heads above the aperture and in the basin were stationary. As a change in the head of discharge necessarily affected the level in the basin somewhat later, if simultaneous readings were taken of the two gauges, the depth on the weir would not correspond to the discharge through the aperture—hence it became necessary to apply a correction in making the calculations. As the observations were taken every minute, the rate of variation of the depth on the weir could be ascertained, and the corresponding variation in the discharge could be calculated from the area of the basin. In making up the final results, means of experiments in which the heads of discharge were nearly constant were taken, being corrected if necessary, as well as means of all the observations, and uniform observations which needed no correction. Mr. FRANCIS' formula was used for computing the discharge from weir measurements, in the experiments of discharge from the apertures—but in those for leakage, where the depth on the weir was very slight, the discharge was increased 6 *per cent.*, in accordance with PONCELET'S and LEBROS' experiments.

The co-efficient of discharge was calculated as the ratio of the actual discharges to the discharge through an aperture of the same size with a velocity due to the head above the center of the aperture. To compute this theoretical discharge, the value of g, the acceleration due to gravity, was calculated by Mr. ELLIS for the place in which the experiments were conducted—LA PLACE'S formula being used, with BESSEL'S constants, giving the value,

$$g = 32{\cdot}16107 \text{ feet.}$$

The accompanying table contains the dimensions of the apertures, and the co-efficient of discharge, taken generally from the means of the observations:

Series.	Aperture.	No. of experiment.	Mean head on center of aperture, in feet.	Co-efficient of discharge.
A.	Vertical, 2 feet wide, 1·99975 feet high. Area, 3·9995 sq. ft. Thickness, 17-32 in.	2, mean.	2·0660	·60871
		3, mean.	3·0469	·59787
		4, mean.	3·5408	·60591
B.	Vertical, 2 feet wide, 1 foot high. Area, 2 sq. ft. Thickness, 17-32 in.	8, mean.	1·8096	·59757
		9, mean.	3·0328	·59902
		10 A, mean.	4·6614	·59820
		11, mean.	5·6667	·59652
		12, mean.	6·8675	·59771
		13, mean.	7·6864	·59781
		14, mean.	8·4761	·59915
		15, mean.	9·6464	·60014
		16, mean.	11,3140	·60466
C.	Vertical, 2 feet wide, 0·5 feet high. Area, 1 sq. ft. Thickness, 17-32 in.	17, mean.	1·4239	·61141
		19, mean.	4·7460	·60817
		21, mean.	8·5395	·60686
		22 A, mean.	9·6302	·60618
		22 B, mean.	11·5558	·60509
		23 B, mean.	15·0565	·60211
		24, mean.	16·9652	·60067
D.	Vertical, Circular, 2 feet in diameter. Area, 3·14159 sq. ft. Thickness, 11-32 in.	25, mean.	1·7677	·58829
		26, mean.	2·5958	·59353
		27, mean.	4·4735	·60308
		28, mean.	5·8335	·61012
		29, mean.	6·9333	·61163
		30, mean.	8·3432	·61222
		31, mean.	9·6381	·61530
E.	Vertical, 1·0000833 feet square Area, 1·00017 sq. ft. Thickness, ¼ in.	33, mean.	1·4882	·58590
		34, mean.	3·6902	·59844
		35, mean.	4·8036	·59755
		36, mean.	5·4908	·59529
		37, mean.	6·7211	·59967
		38 A, mean.	9·8038	·59612
		38 B, mean.	9·9001	·60127
		39, mean.	12·0046	·59971
		40, mean.	13·6293	·60072
		41, mean.	15·1322	·60079
		42, mean.	17·5647	·59687
F.	Vertical, Circular, 1·0007 feet in diam. Area, 0·7865 sq. ft. Thickness, 7-16 in.	43, mean.	1.1473	·57442
		44, mean.	2·3607	·58856
		45, mean.	4·8091	·59014
		46 A, mean.	7·9705	·58318
		47, mean.	10·8819	·59431
		48, mean.	12·4770	·59411
		49, mean.	14·1269	·59528
		50, mean.	15·6640	·59562
		51, mean.	17·7245	·60128
G.	Vertical, Circular, 0·5 feet in diameter Area, 0·19635 sq. ft. Thickness, ⅛ in.	52, mean.	2·1516	·60025
		53, mean.	4·1558	·60224
		54, mean.	6·3476	·60534
		55 A, a.	7·3000	·60076
		55 A, b.	8·0100	·60117
		55 A, c.	9·060c	·60191
		55 A, d.	10·5150	·60114
		55 A, e.	11·9700	·59996
		55 A, f.	12·9800	·60102
		55 A, g.	14·4700	·60064
		55 A, h.	15·4600	·60077
		55 A, i.	15·8500	·60535
H.	Horizontal, Submerged, 1·0007 feet in diam. Area, 0·7865 sq. ft. Thickness, 7-16 in.	55 B, mean.	2·6001	·60851
		57, mean.	4·7096	·59051
		56, mean.	6·4131	·60608
		58 A, mean.	8·1019	·59982
		58 B, mean.	8·7983	·60032
		59, mean.	12·0867	·60054
		60, mean,	14·2484	·60131
		61, mean.	16·2851	·60236
		62, mean.	18·6644	·59926
I.	Horizontal, Submerged, 1·0000833 feet square Area, 1·00017 sq. ft. Thickness, ¼ in.	63, mean.	2·3234	·59871
		64, mean.	3·9178	·60174
		65, mean.	7·9885	·60578
		66, mean.	11.5761	·60464
		67, mean.	14·3052	·61100
		68, mean.	16·2207	·60584
		69, mean.	18·4540	·60459
J.	Horizontal, Submerged, 1·0000833 feet square with curved approach. Area, 1·00017 sq. ft. Thickness, ¼ in.	70, mean.	3·0416	·95118
		71, mean.	5·7593	·94533
		72, mean.	10·5398	·94246
		73, mean.	13·5709	·94337
		74, mean.	18·2263	·94370

TEMPERATURE OF WATER.

Series A,	73°·7 Fahr.	Series F,	75°·6 Fahr.
" B,	76°· "	" G,	72°·8 "
" C,	76°· "	" H,	71°·2 "
" D,	75°·3 "	" I,	71°·6 "
" E,	75°·2 "	" J,	72°. "

From the foregoing brief description, the reader will doubtless see that Mr. ELLIS has been exceedingly minute and exact in the observations, descriptions and calculations. Exception may possibly be taken to the statement that such delicate measurements as are recorded in reference to several of the apertures were made with an ordinary scale, but the methods of making these measurements are almost the only omissions in description that are noticeable. It will be observed, however, that the same apertures were used, in different series of experiments, in water of different temperatures, but are recorded as having the same dimensions in every case. As the variations of temperature did not exceed 4° Fahr., the corrections would, of course, be very slight; but if it is proper to record the measurements to five or more decimal places, a correction that will possibly affect the 5th decimal place may be worthy of notice, especially in calculations where it was thought desirable to introduce a correction for the commonly accepted value of g. The degree of accuracy with which measurements should be made, in any particular case, will depend, of course, upon the relative precision of the different measuring instruments, and also, to a considerable extent, upon the correctness of the theories upon which the results are computed from the measurements; for, if the formulas used in computation are only approximate, it is scarcely worth while to reckon final results to a great number of decimal places, and hence very fine measurements are not necessary. It may be interesting to apply these principles to the experiments in question. From the brief outline which has been given above, it appears that the experiments involved more than a simple act of measurement in which water discharged from an aperture under a definite head was caught in a tank where its volume could be accurately gauged. The head under which the discharge took place was variable, so that simultaneous measurements of head and discharge were not possible, and the actual volume delivered was not gauged in a tank, but was computed from observations of the height on a weir over which it flowed. In addition, all the water passing over the weir did not come from the aperture, but some of it was due to leakage. It will be seen, then, that the final results could only be obtained by calculations, which were not altogether arbitrary, but involved, to some extent, an exercise of judgment. To illustrate: it is well known that there is some slight difference of opinion as to the proper method of computing the discharge over weirs, and it is probably safe to assert that, if these observations had been worked up independently by several experienced hydraulic engineers, their results would not have been identical. It rarely happens that an extensive series of experiments can be worked up without introducing some theories, which, however plausible they may be, lack practical verification, and it seems proper to judge of their correctness, *first*, by the reasons which are advanced in their support, and, *second*, by the character of the results obtained from their application. Thus, if rules and theories which appear both reasonable and probable, when applied to the observations, give results that are in accordance with those of former careful experimenters, and are also consistent with each other, a strong confirmation of the accuracy of both observations and rules is afforded. Probably no one can read Mr. ELLIS' paper without being impressed with the clearness and plausibility, to say the least, with which the theories are stated and defended. It only remains, therefore, to apply the test to the final results, as exemplified in the means given in the above table.

It might be reasonable to expect that from such an extensive series of experiments, it would be easy to see whether or not the co-efficient of discharge varied with change of head. Former experiments generally, although not universally, indicate that the co-efficient decreases with increase of head. From the present experiments it appears:

That in Series C, the co-efficients decrease with increase of head;

That in Series D, the co-efficients increase with increase of head;

That in the remaining series, the co-efficients sometimes increase and sometimes decrease with increase of head, but do neither invariably throughout any one of these series.

As it would be difficult to determine, from these facts, in which way the co-efficient does vary, if at all, with increase of head, it does not seem possible to interpolate values of the co-efficients for the same heads in different series, with any great degree of accuracy. Some comparisons, however, may be made of the effect of change of size, form, and location of aperture, as determined from these experiments, by using the means of the several series. Former experiments with smaller apertures seem to show that, for the same kind of apertures, the co-efficient decreases as the area of the aperture increases. This comparison may be open to objection, in the present instance, as the ranges of head in the several series varied considerably, and can, at the best, only furnish an approximate conclusion.

MEANS OF THE CO-EFFICIENTS, IN THE SEVERAL SERIES.

Series A,	·60416	Series F,	·59077
" B,	·59898	" G,	·60171
" C,	·60578	" H,	·60097
" D,	·60488	" I,	·60461
" E,	·59749		

Mean of the co-efficients for vertical rectangular and square apertures, ·60160
Mean of the co-efficients for vertical circular apertures, ·59912
Mean of the co-efficients for all the vertical apertures, ·60054
Mean of the co-efficients for horizontal apertures, ·60279

The foregoing discussion will probably enable the reader to draw his own conclusions in regard to the following question:

Is it probable that in the discharge of water through large apertures, the co-efficients of discharge actually vary as here indicated, or is it rather to be supposed that a mean co-efficient of 0.6 more accurately represents the result of these experiments?

80 BROADWAY, NEW YORK, April, 1876.

SELECTED LIST OF PATENTS.

FOR THE WEEK ENDING MAY 5, 1876.

Relating to Mining, Metallurgy, Gas Making, Engineering, etc. Reported for the "Engineering and Mining Journal" by Louis Bagger & Co., Solicitors of Patents, Washington, D. C.

176,129. SECTIONAL TUBULAR BOILERS. W. DOUGHERTY, NEW YORK.—An improvement in sectional boilers, having the junction at the top, in combination with sections standing crosswise the structure, and with drum standing lengthwise, provided with the connections.

176,130. PROCESSES OF UTILIZING BESSEMER-STEEL WASTE. W. FIELDS, WILMINGTON, DEL.—The scrap is first melted with chromate of iron, salammoniac, saleratus, sal-soda, York ore, litharge, and iron scale; then remelted with chromate of iron, sal-ammoniac, black oxide of manganese, antimony, wolfram, saltpetre, and charcoal.

176,141. CUT-OFFS AND GEARS. J. KNOWLSON, TROY, N. Y.—A device for governing the point of cu -off in a steam-engine, consisting of a swinging segment, upon which slides a swinging block connected to the valve, which is governed by a governor automatically, or is set at some fixed point by a hand-lever, at which steam is to be cut off.

176,147. APPARATUS FOR EXTINGUISHING FIRES. W. PRALL, WASHINGTON, D. C.—A combination of two mains—one containing water, the other compressed air. The portable pump is connected with both, one supplying power, the other water for extinguishing fire.

176,158. GAS-TIGHT JOINTS FOR RETORT-LIDS. A. WOOD, SYRACUSE, N. Y.—A tempered steel ring, with a sharp-edged rib, is secured to the retort lid, a rim of cast metal is secured to the outer end of the mouth-piece, upon which is forced the lid with its sharp-edged rib, for making a tight-joint.

176,199. INJECTORS. S. RUE, PHILADELPHIA, PA.—The steam-plug is made in two

parts, fitted telescopically, so that the steam can only get into the water-chamber by passing through the entire length of the plug.

176,203. SPRING-MOTORS. D. SHIVE, PHILADELPHIA, PA.—Two barrels, each containing two springs, winding in reverse directions, are attached to a divided shaft. Washers are interposed between the springs in the drums.

175,260. APPARATUS FOR DISTILLING FRESH WATER FROM SALT. DEWITT ANTHONY, PHILADELPHIA, PA.—In the lower part of the tank is placed the boiler. Above this, with an air-space intervening, is secured the condenser, into which the cold salt water is admitted, surrounding the coil, which communicates by a pipe with the steam boiler, conveying the vapor to be condensed. Another pipe extends from the condensing-chamber to the boiler, conveying to it the salt water. A filter is placed at the entrance of the coil in the top of the condenser.

176,264. PACKINGS FOR STUFFING BOXES. B. BABBITT, NEW YORK CITY. A packing for stuffing boxes, consisting of an unbroken tube of soft metal, in combination with a fibrous filling for supporting its walls, and keeping them distended.

176,265. AIR-PUMPS. B. BABBITT, NEW YORK CITY.—The water-supply pipe entering the piston rod is to prevent the heating of the piston and rod.

176,270. GALVANIC BATTERIES. GEO. BLISS, CHICAGO, ILL.—A second copper-plate, attached to a post arising from the copper element, serves to keep the sulphate-of-copper solution separate from the sulphate of zinc.

176,281. ORE-FEEDERS. T. COCHRANE, SAN FRANCISCO, CAL.—Ore is fed into a hopper, in the lower end of which a hollow truncated cone is fitted. The cone is caused to revolve by means of a clutch being actuated by the blows of the stamp-stem.

176,288. PREPARED WOOD FOR THE MANUFACTURE OF ILLUMINATING GAS. F. EICHBAUM, DETROIT, MICH.—A gas-fuel, composed of non-resinous or hard woods, infused with a certain definite quantity of hydrocarbons, so that, by destructive distillation, it will evolve a permanent or fixed illuminating gas of a desired candle-power.

176,291. APPARATUS FOR PULVERIZING AND AMALGAMATING GOLD AND SILVER ORES. R. FRYER, NEW YORK CITY.—Ore is pulverized by the impact of the descending weights, which fall heavily upon the guide-rods as the machine revolves. During the process the ore may be amalgamated with mercury in the central chamber.

176,384. TRACK-CLEARERS. J. PIELERT, BALTIMORE, MD.—Revolving blades throw the snow back through the passage to the melting chamber, being aided by a current of air created by a fan in said passage.

176,410. CONSTRUCTIONS OF NECKS OF PUDDLING-FURNACES. LUKE RYAN, SHARON, PA.—Sandstone iron-clamped slabs are used in the construction of the neck, to lessen the cutting action of the gases and slag.

176,411. HYDROCARBON-GAS APPARATUS. B. SLOPER, NEW YORK.—A tube extends from the bottom of the carbureter down into the hydrogen-generator. It contains part of the encircling or carbureting oil, and is heated by the heat developed by the decomposition of the water, which as the process progresses and acid becomes spent, rises higher on the tube, thus compensating for the heat absorbed by evaporation of the oil. The temperature of the oil is thus maintained.

MINING NOTES FROM IDAHO, ARIZONA, MONTANA, UTAH, AND COLORADO.

FROM our Western exchanges we take the following information concerning the present condition and progress of some of the principal Western mines. The general tone of the Western press indicates a remarkable degree of energy and success in gold and silver mining in almost every part of our Western mining fields.

IDAHO.—(Idaho *Avalanche.*)—*The Buffalo Mining Company's* Atlanta ledge, situated in Alturas County, near the Boise River, is getting wider and richer. In the last drift the pay streak is now over eight feet wide; two feet of shipping ore, and the balance fine milling ore. In the west drift, the pay streak is four feet wide. They have out about thirty tons of shipping ore, that will average nearly $1,000 per ton, and 125 tons of milling ore that will go about $100 per ton. This ore has been obtained in running drifts.

The Atlanta ledge proper, is from forty to sixty feet thick between the walls, being composed of quartz, soft and decomposed granite, porphyry, feldspar, etc., and within this mass is found the silver ore, either in veins, "pockets," or "chimneys," sometimes on the south wall, then in the center, or again on the north wall of the ledge. In depth they become more regular. The vein struck, was two and a-half feet in the center, eight feet at the top, and two and a-half feet thick at the bottom, forming a sort of a wedge downward. Four assays gave an average of $67.24; one assay from the north side $122.55; another $152.33 per ton. To this must be added 20 oz. gold; in most cases this percentage of gold is too low. Further assays—without the gold value—give the following results: Average of one and a-half tons, $144.49; extra ore from north side, $840.41; from the south side, $125.68. On the 2d of March, another lot assayed, averaged $317.27 per ton. More recent assays were as follows: near north side, $64.25; south side, at bottom, $245; direct south side, above, $342.42; average of two and a-half tons taken out, $113.09, gold—20 per cent. added.

The Monarch Mining Company in Alturas County, has a considerable amount of ground opened, and a large and rich body of shipping ore ready to be taken down. Twelve hundred feet of drifts and levels have been run this Winter, opening ground for the season's work. They have only got out ore that was met with in running these levels. The lower tunnel, with the drift from it on the south pay streak, is over 1,000 feet in length. An air shaft at the extreme end is now being raised. A drift will also be extended to the pay streak near the north wall, which in the upper works is nearly as rich as the south pay streak. A small force is being worked now on account of the scarcity of supplies. As soon as the snow is gone and supplies arrive, about fifty men will be put to work in the mine. It is believed the mine will yield nearly, if not quite, $1,000,000 this season. The superintendent says, that they expect to send to the Centennial the bullion product of ten tons of the richest ore; what the value of the bullion will be can be judged from the fact that there are now on hand three tons that will yield over $30,000.

The Potosi Mine at Silver City, Idaho, has struck a new ore body 12 to 18 inches wide, and very rich.

ARIZONA.—(From the *Tucson Citizen.*)—*The Longfellow Copper Mine* is situated at Clifton, north of the Gila River, in the north-eastern part of the Territory. This company employs from one hundred to one hundred and twenty-five men, and works about 275 oxen, mules and horses. The great difficulty heretofore in the reduction of ores here, has been the inability to find material that would resist the combined action of fire, and the various moltened metals contained in the ore, but happily that has at last been overcome, and now the furnaces are in successful operation, and with no apparant dispiriting causes in view to dampen the ardor of the enterprise. When I left, the furnaces had been running five days, without the slightest effect on the linings, whilst heretofore a run of twenty-four hours rendered them unserviceable. In the mine there are several cuts and drifts, in all of which ore, yielding from seventeen to eighteen per cent. copper, is said to be found.

From $6,000 to $7,000, has been expended in opening a road to Silver City, to the mines—a distance of 117 miles, by means of which the fertile lands of the Lower Gila were rendered accessible to settlers, and which resulted in their speedy occupation by men of thrift and energy. Another outlay was necessary before utilizing the ores. Their reduction works necessarily had to be built seven miles distant from the mines, and inasmuch as nature had tumbled the intervening space so roughly, edges had to be pared down, boulders blasted and removed, and hills graded—all of which has been done, and now wagons pass over it, carrying from four to six thousand pounds, seven miles west of the Longfellow.

The Cornad Mine also shows well in copper, and perhaps of a richer quality than the Longfellow. These mines have a first rate pack trail leading from one to the other. Charcoal is packed on burros and hauled in wagons twenty-one miles.

Santa Rita Placers.—As has always been the trouble with these gold diggings, the scarcity of water is the one great obstacle. If they can have a good rainy season this Summer, the Santa Rita placers will astonish every one with their richness. But while water is scarce there is a great deal of washing done with what little they have, and the miners are now doing more extensive digging for water than formerly. They have found gold in paying quantities every foot of the way down the new shaft, now 100 feet deep, and from the dirt taken out of the digging of the shaft they have washed enough gold to pay all the expenses of the work. In the midst of the Santa Rita gold placers stands a hill of considerable size, on which has been discovered, located, and opened, a vein of high grade silver ore. There is, naturally, more or less uneasiness among the miners on account of the late Indian outbreak, but work is progressing with its usual activity. The number of men at the Santa Rita placers is now about 150.

MONTANA.—(From the *New North-West.*)—The owners of copper leads of Butte have wisely determined that they will have a smelter erected to reduce their copper ores and have negotiated for its erection and operation. The project contemplates the erection of copper smelting works in Town Gulch, where there is ample facility for the construction of a long condensing flue. The stack of the smelter will be 18 feet, with 40 inches in the clear. The blast will be furnished with a 12 horse-power engine, and blowers of good capacity. The condensing flue will run up the hill some 200 feet, and be topped with a 50-feet flue. A set of Cornish rollers and a Blake crusher will be used to break the rock. It is calculated it will take sixty days to build and complete the works. Butte has entered into no enterprize more needed or more promising than this. Reduction works at home is the way to overcome the scarcity of transportation.

From the Helena *Independent.*—Black copper has been struck on Scott Shannon's lead at Butte, at a depth of 100 feet....The new copper mine, near Trapper City, will be opened soon.....A new copper vein has been found near Argenta.....A splendid vein of copper ore has been found on Indian Creek, in Meagher County.....Gold, silver, and copper veins have been in the Ten-mile Mines.....100 tons of shipping ore from the copper mine in Snow-Shoe Gulch, Deer Lodge County, it is expected will be produced this season. ...Some splendid mines have been discovered on the Rosebud River.....A splendid vein of silver ore has been found on Rock Creek on the Crow Reservation.....The Deep Creek Mines are turning out well.....A scarcity of water, it is feared, will interrupt work in the Nevada Creek Mines.....The Meadow Creek Mines are turning out good pay.....A 4½-foot vein of good coal has been struck on the mine on Lost Creek, Deer Lodge County.....A fine silver lead has been found on Flathead Creek, near Copperopolis.....They propose to put two splendid steamers on the Yellowstone line, which will deliver freight as late as September 15. This company proposes to lower the rates of freights this season.....The New Departure Mine, near Bannack, is turning out ore worth $1,000 per ton.....The Republican Silver Mine, Deer Lodge County, is turning out ore worth $100 to the ton.....The Blue Wing District is rejoicing over the new discoveries in silver ore.....A new silver lead has been found on the Big Hole.....The Norwegian Gulch Ditch has been completed at a cost of $13,000. It has a water capacity of 2,000 inches ....The Silver Moss District, in Deer Lodge County, is turning out rich ore in liberal quantities.....The North-West mill at Philipsburg has made its weekly shipment of $5,000 in bullion. This mill is crushing ore worth $800 per ton.....The Chinese are working ground in the Diamond District abandoned by white men....Forty-two quartz lodes were recorded in Deer Lodge County during the month of March.....The silver product of Montana this year will, probably, double that of last season.

UTAH.—(From the *Mining Review.*)—The production of mines in this Territory during March was as follows:

Silver-lead ore, 7,422½ tons at $100	$742,200
Copper ore, 80½ tons at $50	4,025
Silver bullion	73,473
Total	$819,698

The shipments of base bullion have amounted to 1,438 tons. It is estimated that Utah will produce this year from $11,000,000 to $12,000,000 from its mines.

COLORADO.—(Colorado *Miner.*)—*The St. John Tunnel*, near Montezuma, in Summit County, is 1,200 feet long, and so straight, that a candle-light at one end can be seen from the other. Ore from this tunnel runs all the way from 350 to 1,600 oz. silver. They have only 900 tons of ore on the dump. The upper tunnel is 300 feet in length. The mine has a double-track tramway, 3,000 feet in length, for conveying ore.

Tariff.—This lode is proving itself one of the very best properties in the Territory; some ore, which was recently run, gave a return of 709 oz. silver per ton, first-class, and 344 oz. second-class. The breast of the drift is now at a depth of 80 feet from the surface, and for the last 30 feet running in, they have had six or seven inches of ore such as mentioned.

The Atlantic Mine, in Clear Creek County, is now employing thirty men, and ore is coming out at a lively rate. Eighty sacks, worth about $1,500, were taken out, for the week ending the 29th ult. Wire silver and native silver being thickly sprinkled through the ore.

The Diamond Tunnel has intersected a new lode at the distance of about 1,050 feet in the tunnel. This new discovery shows ore of a very good quality, and, it is thought, will prove valuable.

Cache la Poudre Tunnel.—This tunnel is situated on the eastern slope of Leavenworth Mountain, about 800 feet south-west from the Colorado Central Lode. The Excelsior is 40 feet from the mouth of the tunnel, is one of the best defined veins we have seen. It carries a strong quartz streak of blue carbonates of copper, interspersed with a high grade of gray copper. Shaft 12 feet deep. The Montana, in 100 feet, is a good-looking vein, undeveloped. The breast of tunnel, in 180 feet, is within 5 or 6 feet from the La Fayette Lode.

Baltimore Tunnel.—The operations on this tunnel were begun about a year ago. Drifts have been started from the 130-foot level, from which first-class ore has been taken, steadily improving from 200 oz. to 350 oz., until the last run, which took a sudden jump to 633 oz.; the second-class carrying 427 oz., and the third, 227 oz., beside a large amount of low-grade ore on the dump, for which the concentrating works will give a good price. Six men have thus taken out over four thousand dollars in four weeks. A very strong and continuous vein of ruby and brittle silver is interspersed through the ore-body of this mine.

NOVA SCOTIA COAL PROSPECTS.—The shipping season has now fairly begun, and the prospect of a good summer in the coal trade will soon be determined. The mines are nearly all working their full capacity, raising coal for shipment. For some weeks past the usual "banks" have been making up, but not more than one-half as much coal is now banked as at this time last year. The Halifax Co. have a large quantity raised, and are working their full capacity. The Drummond Mine, of the Intercolonial Co., has been completely pumped out and put in working order during the past winter, and now large quantities of coal are being raised from it. Relics of the unfortunate miners who perished in this mine, at the terrible disaster on the 13th of this month, 3 years ago, were found during the progress of clearing out, and were taken care of. The coal owners speak encouragingly, and a revival of the coal trade, our main interest, is probable at an early day.—*Pictou Standard.*

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending May 6.

Tons of 2,240 lb.	1876.		1875.	
	Week.	Year.*	Week.	Year.*
Wyoming Region.				
D. and H. Canal Co	48,385	645,433	68,172	973,187
D. L. and W. RR. Co	25,697	424,216	72,249	902,100
Penn. Coal Co	18,401	304,570	30,027	388,499
L. V. RR. Co	21,709	305,414	15,756	311,834
P. and N. Y. RR. Co	670	9,082	4,373	26,133
C. RR. of N. J	37,917	348,672	15,127	111,377
Penn. Canal	10,491	30,570	—	—
	163,280	2,067,957	205,684	2,713,110
Lehigh Region.				
L. V. RR. Co	43,841	664,631	5,610	135,158
C. RR. of N. J	30,942	313,904	125	5,532
D. H. and W. B. RR	681	12,591	2,794	14,305
	75,464	991,126	8,529	155,095
Schuylkill Region.				
P. and R. R. RR. Co	145,713	1,136,768	31,355	364 186
Shamokin & Lykens Val.	16,140	146,189	19,598	300,718
	161,853	1,282,257	50,953	664,904
Sullivan Region.				
Sul. and Erie RR. Co	1,456	18,88c	65	5,410
Total	402,053	4,360,220	265,231	3,538,528

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about seven per cent. of the whole production.

The receipts at Port Richmond for the week were 63,000 tons, shipments 40,000 tons, and balance on hand 155,000 tons.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 139,005 tons, as compared with the corresponding period in 1875.

Perth Amboy business :

	Tons.
Received for the week	10,974
Shipped for the week	18,351
On hand May 6	105,487

The Exports of Coal from Baltimore for the week were .... tons, and since Jan. 1st, 10,860 tons, as against 18,354 tons for the corresponding period of 1875.

Receipts of Coal at Boston, for week ending May 5, and years from September 1st, 1874 and 1875.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	720	58,128	49,874
Philadelphia	15,576	413,959	299,880
Baltimore	920	87,978	107,995
Other places	4,268	196,891	129,731
Great Britain	—	4,111	2,124
Nova Scotia	—	12,851	15 170

Belvidere Delaware RR, report.

	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	4,002	51,437	206
" " " South Amboy	11,639	166,358	15,925
Shipments at Coal Port (Trenton)	3,947	47,154	196
" South Amboy	8,864	135,381	96,194

Shipments of Coal from Richmond, from January 1, 1876, to May 6, 1876, inclusive :

By Cannelton Coal Company	7,814
" Peytons " "	4,479
" Blacksburg " "	3,185
" Clover Hill " "	3,360
" Coal Valley " "	3.058
" Lewiston " "	60
" Nuttallburg " "	55
Total tons	22,011

The Production of Bituminous Coal for the week ending May 6, was as follows :

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week, Tons.	Year, Tons.
Tons of 2,240 lb	38,514	431,703
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	4,943	118,623
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	2,828	55,851
*East Broad Top	1,705	24 651
Clearfield Region, Pa.		
*Snow Shoe	915	19,038
*Tyrone and Clearfield	25,556	357,712
Allegheny Region, Pa.		
*Pennsylvania RR	4,933	69,548
Pittsburgh Region, Pa.		
*West Penn. RR	3,444	72.819
*Southwest Penn. RR	803	18,531
*Penn. & Westmoreland gas coal, Pa. RR.	17,668	229,312
*Pennsylvania RR	5,686	103,635

* For the week ending April 28.

The Production of Coke for the week ending April 28.

Tons of 2000 lb.	Week. Tons.	Year. Tons.
Tyrone and Clearfield	..	..
Alleghany Region	..	..
West Penn. RR	1,160	15.903
Southwest Penn. RR	11,732	152,634
Penn. & Westmoreland Region, Penn. RR.	877	11,289
Pittsburgh, Penn. RR	5,380	69,395
Total	17,149	249,221

COAL TRADE REVIEW.

NEW YORK, Friday Evening, May 12, 1876.

Anthracite.

No change is apparent in the position of the coal trade; the demand shows no improvement, and stocks continue to increase. Some account for the lack of activity by dealers having withheld orders, in anticipation of the Combination breaking up, but, it is very evident that the chief cause is in the fact that the requirements of buyers are very small, and but little immediate improvement can be brought about by any action the Combination can take. It is impossible to induce the majority of dealers and consumers to purchase what may not be needed for months. In nearly all classes of business, buyers have noticed such remarkable declines in prices, that they are not easily induced to believe that by purchasing early, they will do as well or better than by withholding their orders as long as possible, which, as a rule, weakens the seller's position. What the demand for domestic sizes of coal may be is very uncertain, but for manufacturing sizes the outlook is not encouraging. Manufacturers are not asking for much coal, and the little they do require is furnished by the companies with some misgivings as to security of payment. Some of the companies and dealers have lost large sums of late by failures among their customers, and are burdened with trade that they are compelled to carry; such being the case, there is an almost total absence of that spirit or life in the trade which was still noticeable last year, when credits were recklessly given on nearly all sides, for the purpose of moving the coal.

The Anthracite Board of Control was in session in Pennsylvania last night. We have not full particulars of the meeting, but from such authoritative information as we have, we infer that the Lehigh Valley R. R. Company has consented to supply only that percentage of all the coal the market demands as is allowed it by the Combination. It is not likely that this company will attempt to control the prices of the operators on its line, but so long as it restricts shipments the other companies will care but little at what prices the coal from this road may be sold; although an irregularity in prices has a demoralizing effect on business.

The simplest and most effective control of the Coal trade can be exercised by simply confirming the action of the Combination to limiting the amount of coal sent to market by each company to its specific proportion of the amount actually called for in the market, whether that be much or little, and there need then be no interference whatever with the price at which coal is sold, except to limit its maximum price, for if each company can supply only a given proportion of the actual sales, there will be no object gained by cutting prices, though there might be in holding for figures above the regulation rate.

Bituminous.

There have been no further important sales reported. Central Pennsylvania continues to dispose of more coal than it did a year ago, with prospects of doing a very large business during the year, although at prices not likely to prove very remunerative. It will have one great advantage: its coal will become well known, and when a reaction sets in, it will reap the benefits of present sacrifices. There is one point, however, that this region may have to contend with, dealing largely with an entirely new trade, in its eagerness to secure business, it may fail to scrutinize, as closely as is necessary in these times, the credit of those with whom it deals. The Cumberland trade lacks all encouraging features. The out-put last week was about 25,000 tons less than for the corresponding week in 1875, making the total decrease in shipments since January 1st, as compared with the corresponding period of last year, about 139,000 tons. In our last we estimated that, unless some prompt action should be taken to enable the mining companies to enter the markets upon a footing with other competitors, the falling off this year, as compared with last, in the shipments from the Cumberland Region, will amount to 750,000 tons. Should the decrease, however, continue at the rate of last week, our estimate would be entirely too low. One or two companies have resumed work, temporarily, on the basis of 65c. per ton for cutting coal.

A petition of the State of Maryland to the Judges of the Circuit Court for Allegheny County, for the forfeiture of the charter of the Consolidation Coal Company, was filed by the Attorney-General of the State, on the 8th inst. The Consolidation Coal Company is ordered to "show cause on or before the 26th inst., why a decree of forfeiture shall not issue as prayed in said petition."

* *Wholesale Prices of Anthracite Coal for May, f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.*

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Weehawken	4 65	4 75	4 85	4 95	5 55	4 85
Pittston at Newburg	4 50	4 60	4 70	4 80	5 40	4 70
Wilkesbarre at Port Johnston	4 65	4 75	4 85	4 95	5 55	4 75
Plymouth, R. A.	....	....	4 85	5 05	5 65	4 85
Susque. Coal Co. at Amboy W.A.	4 65	4 75	4 85	5 05	5 55	4 85
Kingston at Hoboken	4 65	4 75	4 85	5 05	5 55	4 85
Lehigh Coals.						
Old Company at Port Johnston	5 15	....	4 95	4 95	5 55	4 85
Old Company's Room Run "	5 15	....	4 95	4 95	5 55	4 85
Sugar Loaf, Hobok. & Amb. "	5 15	....	4 95	4 95	5 55	4 85
Lehigh Coal Exchange "	5 15	....	4 95	4 95	5 55	4 85
Honey Brook Lehigh	5 15	....	4 95	4 95	5 55	4 85
Beaver Meadow at South Amboy	5 15	..	4 95	4 95	5 55	4 85
Schuylkill Coals at North 9th st., Brooklyn, E. D.†						
Schuylkill white ash	4 65	4 75	4 85	4 95	5 55	4 75
Schuylkill red ash	..	....	....	5 05	5 65	4 75
Shamokin white and red ash	....	....	....	5 10	5 65	4 75
Lorberry	....	....	5 75	5 75	5 75	4 80
Lykens Valley	..	....	6 20	6 20	6 20	5 25

* Contractor's prices are 20c. per ton less.

†The prices of Schuylkill coals for shipment from Philadelphia are 35c. per ton less than at Brooklyn.

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

	Per ton.
Freight from Hoboken and Weehawken to New York	40c.
" " Elizabethport & Port Johnston to N. York.	40c.
" " South Amboy to New York	40c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c.

Freight by the Pennsylvania Coal Company's boats from Newburg to New York 65c.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
" " South Amboy	8 50	....
" Orrel	6 00	6 50
Youghiogheny, Waverly Co., at Balt	4 25	5 75
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	6 00
Fairmount, West Va., " "	4 35	6 00
Newburgh Orrel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va.	....	10 00
" Splint, " at Richmond.	4 50	6 00
" Gas Coal at Richmond	4 00	....
" " " " New York	5 50	....
Peytona Cannel, W. Va. at Richmond	8 50	10 00

Manufacturing and Steam Coals.

Cumberland, at Georgetown and Alexandria, Va	3 65@3 75 5
Cumberland, at Baltimore	3 90@4 00 5 25
Clearfield f.o.b. Canton, Baltimore	3 75@4 00

Rockhill Semi-Bituminous and Broad Top, at the mine, per 2,000 lb., 90, f. o. b. Greenwich, Philadelphia, per 2240 lb, $3 60@3 95, according to destination; at Amboy, 4 60; New York, 5 00.

Clearfield and Allegheny, "Kittanning," "Sterling," "Sonman," and "Eureka," at the mines, per 2000 lb., 90; at Greenwich, Phil., per 2240 lb., 3 75@4 25, according to destination; f.o.b. South Amboy, N. J., 4 75; New York, 5 25.

Foreign Gas Coals.

	Sterling.	Am. cur'cy,
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S	2 00	5 00
Caledonia, at Port Caledonia	1 50	4 75
Glace Bay, at Glace Bay	1 50	4 75
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$5 70	$6 00	$5 30
Lackawanna coal, in yard	5 70	6 00	5 30
Wilkes-Barre, delivered	6 25	6 75	6 00
Lehigh & Locust Mountain, del'd	7 00	7 00	6 00
Schuylkill Red Ash, del'd	7 50	7 50	6 00

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$18 00
Liverpool House Cannel " " " "	†22 00
American " " " "	13 00
Kanawha splint, " " " "	12 00
American Orrel " " " "	11@14
Red Bank Cannel " " " "	14 00
Cumberland " " " "	7 00

† This quotation is furnished to us by Messrs. WARD, TALBOT & OLYPHANT.

Baltimore, Md. May 11, 1876.

Reported by our Special Correspondent.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," Pittston and Plymouth. White ash.	In cars at depot.	By boats afloat.
Lump and steamboat	$4 62	$4 47
Broken	5 10	4 85
Egg	5 20	4 95
Stove	5 51	5 36
Nut	4 66	4 51

Shamokin, (red or white ash), and "Boston," free burning white ash,		
Egg	5 20	5 00
Stove	5 50	5 25
Lykens Valley, red ash,		
Egg and stove	6 05	5 68

From wharf or yard, wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2240 lb. .....$5 25@7 75

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point .....3 90@4 00
West Virginia Gas f. o. b. at Locust Point 4 50
Youghiogheny Gas, f. o. b. at Locust Point.....4 50

Boston. May 6, 1876

THE market for anthracite is dead. Two cargoes of house size have been on the market about three days, and cannot get within 10c. of what Combination rates would bring them. The interest of the street has been over a gossip, though impossible to place its origin, that the Combination, or the pool, allow the operators, on their grate sizes furnace, or lump prices, and that this is making some trouble among shippers; but, as no one hereabouts seems to want just now either size, it seems somewhat difficult to settle on the truth of the story.

BITUMINOUS coal is moving in a quiet way. Most of the railroads hereabouts have cleared their contracts, but the exact prices are not reported.

FREIGHTS continue dull. New York charters offered on large tonnage at 90c., and small at $1, with concessions on bridges. Philadelphia large crafts quote $1.30, and small $1.45. Baltimore. $1.50, and Georgetown charters at the same rates.—*Commercial Bulletin.*

Buffalo, N. Y. May 10, 1876.

Reported by our Special Correspondent.

The Scranton, Wilkesbarre, Plymouth, Shamokin, and Delaware and Hudson (Lackawanna) coals are offered for the present, subject to printed conditions, at the following prices per ton of 2,000 lb.:

Deliv'red at	Elmira. Afloat.	Ithaca. Afloat.	Syracuse Afloat.	Rochester. Afloat	Rochester. ret. del	Oswego f.o.b.
Grate	$4 00	$4 30	$4 45	$5 15	$6 00	$5 40
Egg	4 00	4 30	4 45	5 15	6 00	5 40
Stove	4 40	4 75	4 90	5 60	6 45	5 85
Nut	4 15	4 50	4 65	5 35	6 20	5 60

Delivered at	Erie. f.o.b.	Buffalo. Afloat.	Buffalo. f.o.b.	Buffalo. ret. del.
Grate	$5 90	$5 40	$5 90	$6 25
Egg	5 90	5 40	5 90	6 25
Stove	6 35	5 85	6 35	6 70
Nut	6 10	5 60	6 10	6 45

Cost of coal from Erie, Oswego, or Charlotte for Western market, same as if shipped from Buffalo. Terms cash. All payments to be made in New York City funds.
C. M. UNDERHILL, Gen. Salesman, Buffalo, N. Y.

Cincinnati, O. May 9, 1876.

Reported by our Special Correspondents.

The coal market has undergone very little change here for some time, and quotations are about the same, viz.:

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	7½@8c.	—
Pomeroy coal "	5 @6c.	—
Kanawha " "	7 c.	—
Cannel coal, according to quality "	11 @16c.	—
The following are the retail prices delivered		—
Youghiogheny	10c.	—
Pomeroy	9c.	—
Cannel	14@22c.	—
Kanawha Semi-Cannel	10c.	—
Anthracite, per ton	10 50@11 00	
Coke, at yard	7c.	—
Coke, hard and soft, delivered	9@10c.	—

Under date of May 1, Mr. J. W. GRUBBS makes the following recapitulation of the coal business of Cincinnati for the month of April:

	Bushels.
On hand in yard and river, March 31	4,096,000
On hand in landings, March 31	1,582,000
Arrivals during month of April	3,871,500
	9,549,500
On hand in yard and river, April 30	5,259,500
On hand in landings, April 30	2,417,000
Consumption for month of April, 1876	1,873,000
	9,549,500

AVERAGE PRICE OF COAL WHOLESALE FOR THE MONTH.

Nos. 1 and 2 Pool, 7¼ to 7¾c.; No. 3 Pool, 7¼ to 7½c.; No. 4 Pool, 6¼ to 6¾c.; Nut, 5¼c.

Chicago, Ill. May 10, 1876.

Specially reported by Messrs. RENO & LITTLE, Coal Merchants.
Retail prices per ton of 2000 lb. delivered to buyer.

A few cargoes of coal from Erie, Pa., and Cleveland, Ohio, have arrived during the week. The demand for coal of all kinds is light. Employees about the coal docks are idle. Vessel men complain that they can get little or nothing for carrying coal to market. Dealers complain that they cannot sell what coal they have on hand—and what is worse, they cannot collect the pay for what they have sold. There is a general disappointment about the opening price this spring at Buffalo—ten cents a ton less than one year ago seems to be regarded as entirely inadequate. It is not in accord with these dull, hard times.

BITUMINOUS.			
Lehigh Lump	$10 50	Briar Hill and Erie	@ 6 00
Lehigh grate and egg	10 50	Walnut Hill, Pa.	@ 6 50
Lehigh stove and chest.	11 00	Midway, Pa.	@ 6 50
Lackawanna, Wilkes Barre and Pittston*		Cannel	@ 8 00
Grate and egg	9 50	Blossburg	7 50
Stove and chestnut	10 00	Indiana Block	6 00
		Hocking "Brooks"	6 50
		Wilmington and Illinois.	5 00

* 50 cents off these prices for car load lots to country dealers and manufacturers.

Cleveland, O. May 8, 1876.

Specially reported by Messrs. BATES & MARTIN.

Herewith you will find the proceedings of our Coal Exchange, and quotations of coal, showing quite a reduction under previous reports. Owing to the strike in the Massillon region there is but little, if any, in the market, and great uncertainty as to when there will be. There is no scarcity of coal, Straitsville, Brier Hill, and Hocking Valley supplying the demand.

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	For vessels,	On cars.
Youghiogheny Gas Coal	$4 10	$4 00
Cannel	4 25	4 15
Blossburgh	5 00	5 00
Briar Hill Block Coal	3 50	3 25
Straitsville Coal Co., lower vein	3 00	2 90
" " " whole "	2 90	2 80
Hocking Valley	2 90	2 90
Massillon	3 00	3 00
Tuscarawas Valley	2 65	2 60
Columbiana	2 65	2 60

RETAIL DELIVERED.

	Lump.	Nut.
Briar Hill	$4 50	$3 50
Massillon	4 50	4 00
Mineral Ridge	4 50	4 00
Columbiana	3 25	3 00
Straitsville Coal Co., lower vein,	4 00	3 50
Tuscarawas Valley	3 25	3 00

ANTHRACITE DELIVERED.

	Grate.	Egg.	Stove.	Chestnut.
Lehigh	$9 50	$9 50	$10 00	$9 75
Wilkes-Barre	8 00	8 00	8 50	8 25
Lackawanna	8 00	8 00	8 50	8 25

Erie, Pa. May 2, 1876.

Wholesale, per ton of 2000 lb. Bituminous f. o. b.

Briar Hill lump	$3 75	Beaver lump	$3 50
Midway	3 25	Cat Fish	3 00

At the annual meeting of the Cleveland Coal Exchange, held at the rooms, No. 89 Seneca street, last evening, the following officers were elected for the ensuing year:

President—E. N. HAMMOND.
First Vice-President—F. A. BATES.
Second Vice-President—J. F. DRAKE.
Treasurer—J. A. BEIDLER.
Secretary—H. E. CHUBB.
Board of Directors—J. C. BACHELOR, C. H. CLARK, H. KRAUSE, DANIEL MARSHALL, and B. Smith, all elected for one year.

Indianapolis, Ind. May 9, 1876.

Specially reported by Messrs. COBB & BRANHAM.

We quote coal in our market as follows:
Wholesale on board cars, and retail delivered to consumers.
Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

Indian Creek, per ton	$2 75	Peytona cannel, per ton.	7 00
White River, "	2 75	Indiana Cannel	6 50
Brazil Block, "	2 90	Hocking Valley	4 25
Highland, grate, "	2 50	Youghiogheny	4 75
Block coal, nut, per car.	18 00	Blossburg (smithing)	6 50
Highland " "	18 00	Piedmont "	6 50
Block Slack " "	17 00	Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$8 70	Nut	8 75
Egg	8 70	Stove	9 00

Lehigh Anthracite.

Broken	10 35	Nut	10 35
Egg	10 35	Stove	10 60

Retail, per bushel, delivered.

Sand Creek	16c.	Block Nut, steam	9
White River	14	" Slack, "	8
Brazil Block	15	Peytona Cannel	28
Highland grate	13	Virginia "	27
Block Nut, domestic use	12	Youghiogheny	22
Highland Nut, " "	12	Blossburg	26
" " steam	9	Piedmont	26

GAS COKE (measured.)

Crushed	15c.	Lump	12c.

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes)	$9 75 per ton,
Lehigh, retail	$11 50 per ton.

Louisville, Ky. May 9, 1876.

Specially reported by Messrs. BYRNE & SPEED.

Our market is now, as during most of the Winter, very quiet.

Please report our prices as follows:

WHOLESALE.

	per bushel		per bushel
Pittsburgh	12c.	Pine Hill	—
Raymond City	9c.	Kentucky	8c.

RETAIL.

	per bushel		per bushel
Pittsburgh	12c.	Peytona Cannel	20@22c.
Raymond City	11c.	Buckeye "	20c.
Pine Hill	13c.	City-made Coke	10c.
Kentucky	10c.	Anth., per ton,	$10 00 to 10 50
Screened Pittsburgh per load			$3 00
Screened Raymond City			2 75
Pine Hill (Kentucky)			2 75
Cannel			$5 to 5 50

Milwaukee, Wis. May 9, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.
Retail price per ton of 2000 lb.

Lehigh Lump	$10 00	Briar Hill, select	$8 00
Lehigh Prepared	11 00	Blossburgh	8 00
Lackawanna (all sizes)	10 00	Cannel	8 00
Pittston	10 00	Pittsburgh	7 00
Scranton	10 00	Steam coal	5 00

New Orleans, La. May 9, 1876.

Reported by C. A. MILTENBERGER & Co.

Pittsburgh coal, retail, per bbl	30c.
" wholesale	50c.
" steamboats, per box	50c.
" to manufacturers, per bbl	50c.
" shipments, per hhd	$6 00
Anthracite, wholesale, per ton	....
" retail, "	12 50
Virginia Cannel, per bbl	8oc.
Scotch " "	80c.
Mt. Carbon, wholesale, per bbl	....
" " retail, "	55c.
St. Bernard wholesale, per bbl	....
" retail, "	50c.

Richmond, Va. May 9, 1876.

Specially reported by S. H. HAWES, Dealer in Coal.
Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 50
" semi-Cannel	4 75	Clover Hill Coal	4 00
Coalburgh Splint	4 75	James River Bitum	3 30
Lewiston "	4 75	" " Carbonite,	5 80
Kanawha Gas coal	4 50		

Toledo, Ohio. May 9, 1876.

Specially reported by Messrs. GOSLINE & BARBOUR.

We quote coal as follows:
Per ton of 2000 lb. on cars.

Hocking Valley	$3 40	Massillon	3 60
Straitsville	3 40	Youghiogheny	5 00
Shawnee	3 40	Blossburg	6 50@7 00
" nut	2 90	Cumberland	6 50@7 00
Briar Hill	5 50	Connellsville coke	6 40

ANTHRACITE.

Grate, screened	$7 20	Stove, screened	$7 70
Egg, "	7 20	Chestnut "	7 45
Lehigh Lump	9 50		

40 cents to $1 per ton additional for delivery at retail.

Toronto, Ont. May 9, 1876.

Chestnut	$7 25
Stove	7 50
Egg and grate	7 25
Bituminous coal for domestic use	6 00
" " steam	3 50@5 50
Lehigh Lump and broken	7 50
Blossburgh	6 50

Halifax, N. S. May 9, 1876.

Prices per ton of 2240 lb. in gold.

Sydney (old mines)	$4 00	Little Glace Bay	3 35
Gowrie	3 35	Blockhouse	3 35
Victoria	—	Albion (at Railroad)	4 00

Montreal. May 9, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.
Wholesale per ton of 2240 lb.

Scotch Steam	$6 00	Cape Breton Steam	$5 25
Pictou "	5 75	Newcastle Smiths.	7 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$8 50	Chestnut	8 50
Stove	9 50		

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals, per ton of 2240 lb	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley	From Sugar Notch.
To ‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey	2 32	2 18	2 74	2 63	2 86	
‡ Mauch Chunk, Pa., via Central Railroad of N. J.	14	..	56	47	70	
‡ Philipsburg, N. J., (46 miles)	87	73	1 21	1 19	1 42	
Elizabethp't, (114 m.) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	1 96	1 82	2 29	2 27	2 50	
High Bridge, N. J.	2 40	1 95	2 80	2 54	2 72	
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	2 32	2 18	2 65	2 65	2 88	
Jersey City, N. J., (121 miles) and New York, via L. V. RR	2 32	2 18	2 65	2 65	2 88	
Andover, via Delaware, Lackawanna and Western RR.	3 30	3 10	3 70	3 69	3 99	
Trenton Somerset Junction and Greensburg, via P. RR. Belvidere Division	2 65	2 45	3 05	3 04	3 34	
Trenton, (97 m.) for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76	

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City† via Lehigh Valley RR. $2 7
From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. and L. and S. RR. and North Penn. RR 1 75
††From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware. Lackawanna and Western RR., Morris and Essex Division 1 08
From *Lackawanna Junction* to **Auburn, N. Y.*, (191 m.) for shipment, via Southern Central R.R. in connection with Pa. and N. Y. R.R. 2 41
From *Lackawanna Junction* to *Weedsport* (201 m.), for *Rochester and Charlotte* 2 47
From *Lackawanna Junction* to *Sterling* for *Oswego, N. Y.* .. 2 50
‖ To this point for all places between Rochester and Buffalo the rate is 2 53
* The rate to this point for Syracuse is 2 08
** Rates on line coal from Hazleton are 10c. per ton above these figures.
‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.
§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.
† Transportation on Coal destined for re-shipment from this point is 20c. less than above rate.
†† The rate for consumption to this point is $1 80.
The distances in the above table are Computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 mil es, and from *Penn Haven* 8 miles.
From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 161 miles, and from *Mauch Chunk* it amounts to 106 miles.

Freights.

Per ton of 2240 lb.

Ports.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	....	....	....
Albany	†80	...	...	....
Amesbury, Mass	....	....	....	....
Bangor, Me.	....	2 00	....	1 00
Bath, Me.	....	1 40	160–65	1 00
Baltimore	....	....	....	....
Boston, Mass	1 25@1 35	1 45	150–55	1 00
Bridgeport, Ct	*70	1 40	....	60
Bristol, R. I.	....	....	....	85
Cambridgeport, Mass.	§1 30@1 35	....	...	1 00
Derby.	...	....	...	....
Dighton	....	....	....	....
East Cambridge	§1 30@1 35	....	....	§1 00
Fall River	1 25	1 40	....	85
Hackensack	*70	....	....	....
Hallowell, Me.	....	....	....	....
Hartford	*70	....	....	....
Hoboken	†70	1 30	1 25	40
Hudson	....	1 30	1 40	....
Jersey City	70	1 30	1 25	40
Lynn, Mass	....	...	....	†1 00
Middletown	....	....	....	1 00
Mystic	....	....	....	....
Newark	....	1 50	....	....
New Bedford	1 25	1 40	....	85
Newburyport	....	1 60	...	1 10
New Haven	*70	1 40	1 35	60
New London	1 25	1 50	....	75
Newport	1 25	....	....	85
New York	70†	1 30	1 25	40
Norwalk	70‡	1 40	....	60
Norwich	1 25‡	....	....	80
Pawtucket	1 25‡	....	....	....
Philadelphia	....	....	....	....
Portland.	1 25	1 45	....	1 00
Portsmouth, N. H.	1 40	1 60	....	1 10
Providence	1 25	1 40	....	80
Poughkeepsie, N. Y.	....	....	....	....
Rockport.	....	....	...	....
Saco.	....	....	....	....
Sag Harbor.	....	....	....	1 00
Salem, Mass	1 25@1 35	1 50	....	1 00
Salisbury Pt., Mass.	....	....	....	...
Stamford	*70	....	....	60
Stonington	....	....	....	....
Taunton	....	....	....	....
Troy	†80	....	....	....
Warren, R. I.	....	....	....	85
Wareham	....	....	....	....
Weymouth	....	....	....	....

*And discharging and towing. †And discharging. ‡And towing. § 3c. per bridge extra.

Freights on Bituminous Coals from the Mines to Tide Water Shipping Ports.

From the Mines to Cumberland and State Line (say an average of 20 miles), the legal charge is 2 cents per ton of 2240 lb. per mile.

From State Line to Amboy (346 miles) $4 per ton of 2000 lb. On coal shipped beyond this point there is a drawback of 75 cents per net ton.

From Cumberland to Baltimore (178 miles) $2.02 per ton of 2240 lb., or $1.80 per net ton (¼ cent per ton per mile for use of hoppers over C. & P. RR.).

From Cumberland to Georgetown (152 miles) by canal, $1.10. Tolls, 46 cents.

From the Mines to Piedmont, 4 cents per ton of 2240 lb. per mile on distances less than 4 miles, and 3 cents per ton per mile on distances over 4 miles, and 2 cents per ton per mile on distances over 10 miles.

From Piedmont to Baltimore (206 miles) $2.34 per ton of 2240 lb., or $2.08 per net ton.

From Osceola to Greenwich, Phila. (say 248 miles) per T. & C. RR, per ton bituminous coal of 2000 lb., less drawback of $1.46 $2.15; rate per gross ton, $2.60.

From Osceola to South Amboy, N.J., (317 miles) per 2000 lb., $4.03, less drawback, $1.03: rate per net ton, $3; add 12 per cent. for gross ton, 36 cents, terminal expenses, shipping, 20 cents; rate per gross ton, $3.56.

Freights on Bituminous Coal and Coke over the Chesapeake and Ohio Railroad.

To	From New River District, say, at Quinnemont.			
	Bituminous Coal and Coke.			Coal Screenings
	Distances.*	Regular Rate.	Special Rate.	Rate.
	Miles.			
Charleston	75	1 00	70	50
Huntington	127	1 20	80	60
Staunton	158	2 30	2 00	1 50
Charlottesville	197	2 80	2 50	2 00
Gordonsville	218	3 00	2 70	2 40
Hanover Junction	276	3 25	3 10	2 50
Richmond	294	3 25	3 10	2 50
Richmond *via* Hanover Junction		3 50	3 35	2 75
James River	297	3 25	3 00	2 50

To	From Kanawha District, say, at Blacksburg				
	Bit. Coal and Coke.		Cannel Coal.		Coal Screenings.
	Regular Rate.	Special Rate.	Regular Rate.	Special Rate.	Rate.
Charleston	80	50	1 20	80	40
Huntington	1 00	60	1 50	1 00	50
Staunton	3 00	2 50	4 00	3 50	2 00
Charlottesville	3 30	2 80	4 25	3 70	2 30
Gordonsville	3 35	2 90	4 40	3 90	2 40
Hanover Junc	3 40	3 10	4 50	4 10	2 50
Richmond	3 40	3 10	4 50	4 10	2 50
Richmond, *via* Hanover Junc.	3 65	3 35	4 75	4 25	2 75
James River	3 4	3 00	4 50	4 00	2 40

A Terminal charge of ten cents per ton, in addition to rates above, will be collected on all coal and coke at James River. Also, at Huntington, a charge of five cents per ton for transferring by tipple, or ten cents per ton for transfer from car to barge on the river track.

This Tariff supersedes all *Special Rates* on coal and coke to any station, except existing special rates to iron furnaces.

Local Tariff No. 7 will govern rates to all stations, excepting as modified by this special tariff but the rate to any station, between the stations above designated, shall in no case exceed the rates named herein, to the first point beyond it, of the stations above named.

Special Rates—The rates given above in columns headed "Special Rates," will apply on all shipments of coal or coke mined or made on the line of this road, destined for use in steam or manufacturing purposes; also on all shipments destined for any point off the line of the Chesapeake and Ohio Railroad

Agents, when they cannot be certain that shipments are destined for use in steam or manufacturing purposes, will collect freight at regular rates as above, and overcharges, if any occur, will be promptly refunded through the General Freight Office.

A charge of twenty-five cents per ton, in addition to all rates herein given, will be made for delivery of coal or coke at points *between stations* requiring the use of an engine.

Coal Screenings—By "Coal Screenings" is meant dust, nut and fine coal that will pass through a screen of one and a half inch meshes, and will only be taken at the Company's convenience.

* These distances are computed from Quinnemont (or the New River District) Blacksburg (or the Kanawha District) lies 56 miles west of Quinnemont, which distance will be added to all coal going east of the New River District and deducted from Huntington and Charleston, which lie west of the same.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, May 12, 1876.

American Pig.—We note sales, aggregating 1,200 tons, of the Thomas Iron Company's No's. 1 and 2 foundry iron at $22, and $20 per ton respectively. With this exception we learn of no business worthy of note. Buyers are withholding their orders as much as possible, believing that they will not have to pay higher prices during the summer, and that the chances are in favor of lower ones. Some companies still claim to hold No. 1 foundry at $23, but we fully believe that any of them would sell for less: and furthermore, that some have done so during the week. If a large lot were put on the market, it would not bring within one or two dollars per ton as much as our quotations. We have seen some evidence of this during the past month. We quote No. 1 foundry at $22; No. 2 at $20; and forge, at $18@$19.

Scotch Pig.—We note sales of 200 tons of Eglinton and 100 tons of Coltness on private terms. We quote Eglinton at $28@$28.50; Glengarnock, $30; and Coltness, $31. The importations continue to be disposed of as soon as they arrive.

Messrs. JOHN E. SWAN & BROTHERS, Limited, of Glasgow, under date of April 28, report as follows: Furnaces in blast, 111, against 120 a year previous; quantity of pig-iron in CONNAL & Co.'s stores, 62,814 tons, as against 30,494 tons at the corresponding date in 1875; shipments for the week ending April 22, 9,490 tons, as against 13 291 tons for the corresponding week of 1875; decrease in shipments since Dec. 25, 1875, as compared with the corresponding period of 1874-5, 37,918 tons; increase of imports of Middlesbrough pig-iron since Dec. 25, 1875, as compared with the corresponding period of 1874-5, 17,785 tons; quotations of No. 1 iron: Gartsherrie, 66/; Coltness, 67/; Summerlee, 63/ 6d.; Langloan, 66/; Glengarnock, 64/ 6d.; and Eglinton, 57/ 6d.; rates of freight: To New York, 3/ 6d.; Boston, 9/; New Orleans, 5/; Baltimore, 8/; Philadelphia, 10/; and San Francisco, 27/ 6d.

Rails.—We note a sale of 250 tons of 50 lb. iron rails at $44, f.o.b., Elizabethport, and 300 tons, said to be at $38, at a Pennsylvania mill. Steel rails continue very quiet, although most of the mills are well supplied with orders. We quote iron rails at mills at $40@$43; and steel at $60@$63.

Old Rails.—There are no further sales reported. We hear of a lot offered at $21.50 with no buyers.

Scrap.—There is but very little business doing in No. 1 wrought, which is nominally quoted at $29@$30.

Boston.

May 6, 1876.

PIG has been very quiet. Buyers have very few wants, and they procrastinate supplying these, anticipating a concession on the firmness established a week or so ago. In foreign pig there is not a ripple of inquiry. The stove men, who usually about this time begin to canvass up their summer supplies, take no interest in imported iron at its quotations. American quotes a range of $20@26 for gray forge and No 1.

BAR is moving in a moderate way, with no especial change in the tone, 2 3-10c., or $51.50 being the current values to guaranteed refined. There are rumors of concessions on these rates, but they cannot be tracked to any reliable source by the closest canvassing. One or two mills have taken orders for common iron, say two-thirds old rails and one-third scrap, at about $40 delivered, and offered all old-rail stock at $42. Possibly out of this have arisen the reports. Refined bar iron was sold, say a month ago, in this market at $48, when quotations were $49, and offers to sell at $47.50 were named here at the time reported, but we think, if a buyer can secure the same iron now at $51 even there must be something unusual. We think the trade without exception will bear us out in the statement that our reports have followed the actual condition of the market very closely.

STEEL is quiet, prices are steady, receipts and stock moderate.

We quote American tool 14@15c; American Machinery 8½@9½c; Bessemer tires 5¾c; Sweet's Excelsior Tire, 7½c; English Tool, 15½c. gold.—*Commercial Bulletin.*

Baltimore.

May 10, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

There is no change to note in the iron market since our last report. We note rather more inquiry for best brands, with sales at quotations.

Baltimore Charcoal	$30@35	Anthracite No. 3	$20@21 00
Virginia Charcoal	28@34	Mottled and White	17@19 00
Anthracite No. 1	23@24	Charcoal C B. Blooms	65@67 50
" No. 2	21@22	Refined Blooms	50@55

Chattanooga, Tenn.

May 9, 1876.

Specially reported by J. F. JAMES pig iron broker, etc., 233 Market Street.

The market remains unchanged, sales being made only for immediate wants.

The usual four months' time on quotations below is allowed.

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	$21@ 22
" " " " No. 2 foundry	20@ 21
" " " " gray forge	17@ 18
" and Georgia coke, No. 1 foundry	18@ 19
" " " " No 2 foundry	17@ 18
" " " " gray forge	15@ 16
White and Mottled	14@ —
Tennessee and Georgia cold-blast car wheel	24@ 25
Alabama " "	24@ 25
Old Rails, cash	21 50
Cast Scrap	" 12
Wrought Scrap	" 16

Cincinnati.

May 9, 1876.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

The demand for foundry irons is fair, but other grades are neglected. We quote:

CHARCOAL.		
Hanging Rock, No. 1 Foundry	$25 00@	—4 mos
" No 2, "	23 00@	—4 mos
" Mill	22 00@	—4 mos
Tennessee, No. 1, Foundry	24 00@	—4 mos
Tennessee, No. 2, "	23 00@	—4 mos
" Mill	21 00@22 00	—4 mos
Missouri, No. 1, Foundry	@	—4 mos
STONE COAL.		
Ohio, No. 1, Foundry	23 00@	—4 mos
" No. 2, "	22 00@	—4 mos
Ohio Mill	21 00@	—4 mos
Missouri, No. 1 Foundry	27 00@	—4 mos
" No. 2, "	26 00@	—4 mos
" Mill	24 00@	—4 mos
CAR-WHEEL.		
Hanging Rock, C. B	40 00@45 00	—4 mos
Tennessee "	30 00@33 00	—4 mos
Missouri "	33 00@35 00	—4 mos
Alabama "	30 00@33 00	—4 mos
BLOOMS.		
Charcoal	60 00@ 75 00	—cash
SCRAP IRON.		
Cast	50c.@ 85	—cash
Wrought	1 00@1 25	—cash

Cleveland, Ohio.

May 9, 1876.

Messrs. C. E. BINGHAM & Co., quote as follows:

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.	
No. 1, Lake Superior Charcoal	27 00@....
No. 2, " " "	26 00@....
No. 1. Anthracite	25 00@....
No 2, "	23 00@....
No. 1, Bituminous	25 00@ ...
No 2, "	23 00@....
American Scotch, No. 1, Cherry Valley	27 00@....
" " B—1, " "	26 00@....
" " No. 2, " "	24 00@....
No. 1, Massillon	25 00@....
B—1, "	25 00@....
No. 2, "	23 00@....
CAR WHEEL AND MALLEABLE IRON.	
No. 3 Lake Superior Charcoal	26 00@....
No. 4 " "	27 00@....
Nos. 5 and 6 "	28 00@....
BESSEMER IRON.	
Nos. 1 and 2 Lake Superior Charcoal	27 00@....
FORGE IRON.	
No. 1, Gray	22 00@....
White and Mottled	21 00@....

Louisville.

May 9, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

Our market is fairly active, without any decided change since last report.

The usual time, four mos., is allowed on the quotations below:

HOT BLAST—CHARCOAL.	
No. 1 Foundry, from Hanging Rock Ores	$25 00@26 00
No. 2 " " "	23 00@24 00
No. 1, Mill, from " "	—@—
No. 1. Foundry, from Alabama, Georgia and Tennessee ores	23 00@24 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	22 00@23 00
No. 1, Mill, from " " " " "	21 00@22 00
HOT BLAST—STONE COAL AND COKE.	
No. 1, Foundry, from Hanging Rock Ores	23 00@24 00
No. 2, " " " " "	22 00@23 00
No. 1, Mill, " " " " "	21 00@22 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	23 00@24 00
No. 2, " " " " "	22 00@23 00
No. 1, Mill, " " " " "	21 00@22 00
No. 1 Foundry, from Missouri Ores	24 00@25 00
No. 2 " " " "	24 00@25 00
No. 1 Mill, from Missouri Ores	25 00@26 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@40 00
" " Tennessee "	28 00@30 00
" " Alabama and Georgia Ores	28 00@38 00
" " Kentucky Ores	28 00@40 00

Pittsburgh, Pa. May 10, 1876.

Specially reported by A. H. CHILDS, Esq.

There is a fair business doing to supply current wants of mills carrying light stocks. Foundry metal continues dull.

No 1. foundry	$23 50@25 00—4 mos
" 2, "	22 00@23 00—4 mos
Gray forge	21 00@22 50—4 mos
White and mottled	18 00@20 00—4 mos
Warm blast charcoal	22 00@23 00—4 mos
Cold blast " Western	40 00@45 00—4 mos

St. Louis. May 10, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

We have no change to report regarding our market Demand very light and prices lower than ever.

We quote on four months' time:

Mo. Stone Coal No. 1 Fy. $25 50	Massillon iron, A No 1.32@—
" " " 2 " 25 50	" " B " 1.31@—
" " Gray Mill, 24@25	" " " 2.28@—
" Charcoal No. 1, Fdy. 24 50	Cold Bl. Car Wheel, Mo. 30@33
" " " 2, " 24 50	" " " Tenn. 30@33
" " Gray Mill, 23@24	" " " Ala. 30@33
Tenn. " No. 1, Fdy 24@—	" " " H. R. 33@35
" " " 2, " 22@—	Mo. Charcoal Blooms.. 60@70
" "Gray Mill 22.50@—	" Scrap " 55@60
Va. Coke, No. 1, Fdy. 25@—	" " hammer-
" " " 2, " 23@—	ed Billets ..... 75@80
" "Gray Mill, 23@—	Assorted Bar Iron 2 35, 90days
H. R. Char. No. 1, Fdy. 26@—	No. 1 Wrought Scrap..1 10 ch.
" " " 2, " 24@—	Heavy cast " ..95 "
" " Gray Mill, 24@—	Light " " ..60 "

Montreal. May 2, 1876.

We continue to quote: Pig iron Eglinton and Clyde $21@21.50; Carnbroe $21.50@22; American $22@24; Summerlie and Calder $22@23; Langloan and Gartsherrie $22@23; Coltness $22.50@23.50; Hematite $30@31. Bar, per 100 lb., Scotch and Staffordshire, $2.20@2.25; best do., $2.50@2.60. Swedes and Norway $5@5.50; Low Moor and Bowling, $6.50@7—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, May 12, 1876.

Some articles show a slightly improved business, but others show a falling off, so that upon the whole there is no improvement in business.

Mr. ERNEST W. S. MURRANT, of London, under date of April 28, says: "A slight recovery has occurred during the past week, owing, it is said, to "Bears" closing their accounts for the present month; at the close, however, prices all round appeared to incline again rather in favor of buyers."

Gold Coin.—During the week under review, gold has ranged from 112¼ to 112¾, and closed at 112⅜.

Bullion.—The silver market is very dull and prices quite nominal. The quotation in the city is $1.15½ per oz., a decline of 1c. since our last. The San Francisco market remains unchanged, quoting at 12 per cent. discount. Cable information, to-day, shows a weak market in London, where the quotation is 53d. per oz., or a decline of ⅛d. since our last. Fine gold bars are unchanged in price, and quoted as follows: New York, par ($20.67, gold, per oz.,) to ¼ per cent premium; San Francisco, par; and in London, 8*s*/ 7½d.

Copper.—The business done in copper during the week under review is hardly worthy of note. Prices have ranged from 21⅛c.@22c., and closing at 21¾c. bid, and 22c. asked. Manufacturers are buying as sparingly as possible.

Mr. MURRANT says of copper: "In foreign, prices have advanced almost £1 in the week, the tendency being still apparently upwards. It will be a very strange circumstance if copper keeps up its prices in the face of the continued fall in tin and iron; especially if such drop should make further progress as is generally anticipated. At the Swansea ticketing of ore on the 25th inst., about 275 tons in fine with an average produce of 23 13 16th's per cent. fetched an average price of 15/5d. per unit. The price of Chili g. o. bs. last night was £79 15/—sellers."

Tin.—There is but little business doing in pig tin. Prices here have advanced in sympathy with those in London. We quote Straits at 17¾@18c.; L. & F. 17¼@17¾c.; Refined, 17¼c.; and Banca, 21⅛c.—prices all gold. By cable, to-day, Straits is quoted in London at £74 10/—an advance of £3 since our last—and in Singapore, nominally, at $20 per picul

Mr. MURRANT says of tin: "The arrivals of foreign for the present month in this port have been, up to the moment of writing, about 2,000 tons—the deliveries for the same period being estimated as about half that quantity. Taking these circumstances into consideration, the market has well maintained itself. The position of this article is, however, critical, and it is only by united action that holders have any chance of keeping prices at their present level, and at best the attendant risk is considerable. The closing price of Straits was 72/—cash sellers."

Tin Plates.—A fair business is doing in these at the following quotations, in gold, per box: Charcoal tins, $7@$7.25, and ternes, $6.50@$7; coke tins, $6@$6.25, and ternes, $5.62½@$6.

Messrs. ROBERT CROOKS & Co., of Liverpool, under date of April 27, says: "Tin plates show no change for the better, and the prospects for the future are far from encouraging. Though prices are unprecedently low, this has had no effect in stimulating buying, even though it is obvious to the most superficial observer that present rates could not pay manufacturers, were the cost of producing at the lowest point ever known. Stocks too are rapidly accumulating, there being now not very far short of 400,000 boxes lying in Liverpool. Altogether we see no reason to expect for some time a higher range of values."

Lead.—The business of the week has been confined to very small lots at prices ranging from 6·15c.@6·25c. gold, and closing at the latter figure. Foreign is quoted at 6¾c.@6⅞c. gold.

Spelter and Zinc.—There is but very little business doing in domestic spelter. Prices range from 7¾c. for outside lots, to 8c. for Combination lots. Sheet zinc is very quiet at 8½c.@8¾c. gold.

Antimony.—We note a sale of 20 casks at 15¼c. gold, with most holders asking, at the close, 15¾c.@16c.

Quicksilver is a little lower and quoted as follows: In New York, 60c.@62c. per lb., and in San Francisco, 58c.@59c., and in London, £10 per flask.

FINANCIAL.

New York Stocks.

FRIDAY EVENING, May 12, 1876.

The recommendation submitted by the president, at the recent annual meeting of the Delaware and Hudson Canal Company, to reduce the annual rate of dividends from 10 per cent., had its effect in another serious break in the coal stocks, the general impression prevailing that the other coal carrying companies would be compelled to adopt the same policy. Mr. DICKSON stated in support of his views "that the prospects of the coal business for this year were not encouraging, and that little improvement could be expected while the iron and other manufacturing interests remain depressed as at present. He therefore recommended a temporary reduction in the rate of the dividends now paid."

This is what we have for some time urged and predicted must necessarily come to pass.

We give below a comparison between the present market value of the stock of the three leading coal carrying companies, and their then value as reported seven weeks ago.

	Capital stock.	Market value March 25, 1876, at 120 per ct.	Market value May 12, 1876, at 106½ per cent.	Aggregate decline in mk't value of stock in 7 weeks.	Percentg. of decl'n.
D. L. & W. RR	$23,500,000	$28,200,000	$25,027,500	$3,172,500	11¼
		At 107¼	At 94½		
N. J. C. RR.	20,000,000	21,450,000	18,900,000	2,550,000	12
		At 120	At 110		
D. & H. C'l.	15,000,000	18 000,000	16,500,000	1,500,000	8

Aggregate decline.....$7,222,500 or over 10 percent.

Consolidation Coal Company.—This stock has sold between 40 and 42 as the limits and closed at 41½, with sales of 1,300 shares for the week.

Bonds are generally lower and comparatively neglected.

Union Mining Company of Tennessee.—13,825 shares of this stock has sold during the week at from 1¾ to 1¾ per share.

The Delaware and Hudson Canal Company.—At the annual meeting of the stockholders of the Delaware and Hudson Canal Company held on the 9th inst., the report showed that the coal sales for the year amounted to $12,034,936 10 The balance of coal on hand December 31, 1875, was $2,629,042.33. The capital account shows a total of credits amounting to $35,343,795.46, with a balance of profit and loss amounting to $2,544,797.85.

The following Board of Managers was elected:—ABIEL A. LOW, ROBERT L. KENNEDY, J. M. HALSTEAD, LE GRAND B. CANNON, GEORGE CABOT WARD, JAMES ROOSEVELT, JAMES R. TAYLOR, THOMAS DICKSON, JOHN JACOB ASTOR, THOMAS CORNELL, W. J. HOPPING, J. P. MORGAN and R. S. HONE.

The proposed amendments to the lease of the Albany and Susquehanna Railroad by the Delaware and Hudson Canal Company, have been agreed to by both companies, and the amended lease placed on record. It provides that the capital stock is to be fixed and limited at $3,500,000, on which the lessee is to pay dividends of seven per cent. annually. The clause of the old lease giving 25,000 shares a preference is annulled, and in consideration thereof the lessee, whenever the $1,000,000 Albany city bonds are paid off, is to to apply the $70,000, now paid annually into the sinking fund, to the payment of additional dividends on the stock, making nine per cent annually

The entire consolidated mortgage bonds of the Co mpany amount to $10,000,000; the payment of principal and interest being guaranteed by the D. & H. Canal Company, the amount to be issued at present will be $1,500,000. The remainder is to be held by the trustee for the redemption of the present outstanding bonds and to meet the requirements of the lease.

The Governing Committee of the New York Stock Exchange has admitted these securities to the Bond list under the title of the First Consolidated Guaranty bonds of the Albany and Susquehanna Railroad Company, dated April 1, 1876, due April 1, 1906. Interest 7 per cent. payable April 1 and October 1, in New York City. The coupon bonds have the privilege of registration.

It is expected that the remaining 12 miles of the New York and Canada road from West Chazy to Rouse's Point will be finished during July.

Auction Sales of Stocks and Bonds, for the week have been as follows.

Consolidation Coal Company, 150 shares at $41½ per share.

Cumberland Coal and Iron Company, 7 per cent. sinking fund bonds due in 1884, $5000 at 76 per cent.

Maryland Coal Company, 500 share at from 13 to 13¼ per share.

Chester and Tamaroa Coal and Railway Company, Ill. 1st mortgage 7 per cent. gold bonds due in 1900 "Hyp" $1,000 each $40,000 sold at 11 per cent.

American Coal Company, 800 shares at from $44 to $46 per share.

Quotations and Sales of Stocks and Bonds,

For the week ending May 12, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	*270	—
Consolidation Coal Co	42	40	41½	1300
Spring Mt. Coal Co	—	—	50	—
American Coal Co	—	—	46	—
Maryland Coal Co	—	—	13¼	—
Del., Lack., and West. RR. Co	108¼	104†	106¾	8762
New Jersey Central RR. Co	97¼	90†	93¼	7844
Delaware and Hudson Canal Co	112¼	110	110¾	947
Quicksilver Mining Co. pref'd	—	—	21	—
" " " Common	—	—	16	100
Mariposa Land & Min. Co. pref'd	—	—	7¾	100
St. Louis & Iron Mountain RR	—	—	†21	—
Lehigh & Wilkes-Barre Coal Co	—	—	*40	—
Total Shares sold				19053
Sales for the week previous				22915
Decrease				3862

* Nominal. † Seller 60 days.

BONDS.

	Sales.		Price
Ches. & O. R. R. 6s, 1st. con. on	1,000	.....	— @ 31
" " " ex coupon	—	.....	— @ —
Central RR. of N. J. 1st Mtg. N	2,000	.....	— @113¼
" " " 1st Cons	—	.....	— @ —
" " " Convt.	14,000	.....	103¼@104
Del. and H. Canal, 1st Mtg. 91	1,000	.....	— @110½
" " 7s, '84	—	.....	— @110
" " Reg. '94	2,000	.....	— @108
Del., Lack. & W. R. R., 7s, conv.	—	.....	— @ —
" " " " 2d Mtg.	3,000	.....	108 @108¾
St. Louis & Iron Mount'n 1st Mtg	8,000	.....	— @100
St. Louis & Iron M'tn, 2d Mtg.	1,000	.....	— @ 75½
Lehigh & Wilkes-Barre Cons	—	.....	— @ —
Total Sales	$32,000		

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, May 12, 1876.

The dealings in stocks at the Philadelphia Stock Board during the period under review, have presented no features which require special comment. The aggregate sales for the week amount to some 90,000 shares, with but slight fluctuations in quotations.

Pennsylvania RR.—This stock has changed hands to the amount of nearly 72,000 shares, selling down to 51⅞, and closing at 53, being a fractional advance on the closing price in our issue of the 6th inst.

Reading RR.—14,000 shares of this stock have changed hands at from 43⅞ to 44½, closing at a slight advance on our quotation of the 6th inst

Lehigh Coal and Navigation Company.—This stock closed at the same price as recorded in our last, viz., 46½; ⅜ represents the extreme range of the quotations for the week, the total transactions amounting to 3,283 shares.

Lehigh Valley RR.—This stock has sold to down to 56½ seller 60 days, but recovered to 58 regular, at which it closed. with sales of 954 shares for the week.

Bonds have sold to the amount of about $50,000 at generally unchanged quotations.

Auction Sales of Stocks and Bonds during the week have been as follows:

Westmoreland Coal Company.—153 shares at $79.50 per share.

Buck Mountain Coal Company.—10 shares at $25 per share.

Little Schuylkill Navigation RR. and Coal Company.—100 shares at $49⅝ per share.

Pennsylvania Salt Manufacturing Company.—20 shares at $68 per share.

Cambria Iron Company.—75 shares at from $15.75 to $16 per share.

Quotations and Sales of Stocks and Bonds.

For the week ending May 11, 1876.

STOCKS.

	Highest	Lowest	Closing	Shr's
Lehigh Valley RR. Co	58	56½†	58	954
Pennsylvania RR.	53	51⅞	53	71900
Reading RR.	44½	43⅞	44¾	14000
Lehigh Coal and Nav. Co	46⅝	46¼	46½	3283
Penn. Canal	—	—	*9	—
Buck Mountain Coal Co	—	—	25	—
Fulton Coal Co	—	—	*3½	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	79½	—
St. Nicholas Coal Co	—	—	*1	—
Cambria Iron Co	—	—	15⅝	100
Crane Iron Co	—	—	25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co	—	—	68¼	11
Total shares sold				90,248
Sales for the week previous				133,575
Decrease				43,327

* These quotations are nominal. † Seller 60 days.

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 7s	—	—@108
" " " 2d " "	—	—@108
" " " 3d " cons	—	—@ 54
Lehigh Valley RR. Con. mtg. 6s, Reg	4,000	101 @101¼
" " " 7s, 1910	9,000	109¼@109½
" " " 6s Reg.	1,000	—@109
Pennsylvania RR., 1st mtge. 6s	1,000	—@106
" " " gen. " con. 1910	—	—@104½
" " " gen. " 6s, reg	1,000	—@106
" " " Cons. M. 6s reg	—	—@ 99
Phil. & Reading RR. 7s '93	5,000	—@107
" " " G. M. 7s, con.	9,000	107 @107¼
" " " " Deb. 7s	2,000	—@ 80
" " new convertible 7s	5,000	—@100
" " mtg. 6s '80	—	—@105†
Phil. & Reading C. & I. Co. Deb. 7s	—	—@81½†
" " Swatara tract	—	—@ —
Lehigh Coal & Nav. Co., 6s '84	—	—@102¾
" " " RR. 6s, '97	1,200	—@103
" " " gen. m. 7s Reg	—	—@ —
" " " Convt. gold, '97	7,000	102½@103¾
Penn. Canal, 6s	5,000	74¾@ 75½
Penn. and N. Y. Canal, 7s	—	—@110
Ches. and Del. Canal, 6s	—	—@ 86½
Susquehanna Canal, 6s	—	—@ 73
Delaware Division Canal, 6s	—	—@ 99¾
Susquehanna Coal Co. 6s	1,000	—@ 80
Buck. Mount Coal Co. 6s	—	—@ 97½
Penn. Gas Coal Co. 6s	—	—@100¼
Total amount of sales	$51,200	

Closing quotations, in the absence of sales, represent the latest prices bid.

† Asked.

Gold and Silver Stocks.

New York, Friday Evening, May 12, 1876.

Mining shares are slightly firmer, we note a recovery of $6 per share in Hale & Norcross, and an advance of $5 in California. Belcher has receded $5 per share, having gone down to $19 during the week, this is a notable decline for this stock, and it is hardly possible in view of the comparative steadiness of the market to have been caused by the *finesse* of the operators, the reason will probably be found in some difficulty in the mine itself.

Consolidated Virginia.—This company has declared its usual dividend of $2 per share, equal to $1,080 000, payable on the 11th inst. The mills are now engaged in their usual monthly settlements, and show the product to have been but little under $2,500,000. The current expenses amount to about $300,000, leaving a balance of about $1,120 000 to be carried to the surplus fund. Another large new mill has been ordered in connection with this mine. It will contain eighty stamps, and will be erected near the Joint C. and C. shaft.

Is the Big Bonanza Giving Out?—Mr. Keene, a prominent broker in San Francisco, who is credited with the recent break in stocks, says, with regard to the Bonanza stocks: "The mine has been failing for some time past, and the large amount of ore extracted within the last three months has so impoverished the ore body on the 1500 and 1550-foot levels, that developments must be made below, or the stock will certainly depreciate in value.

"Secondly, the ore body narrows rapidly from the 1500 to the so-called 1550-foot level, but which is really only 40 feet below the 1500-foot level. If the dip of the ore continues at the same angle, below the 1550-foot level, which it shows between the 1400 and the 1550, there cannot be over 75 feet in length of ore on the 1700-foot level, if the ore body continues that far down. The sinking of the winzes in the Consolidated Virginia and California don't really warrant this estimate of depth, as after gaining a certain point, say 75 ft. below the 1550-ft. level, the ore gradually gets poorer and runs into ore of an inferior grade. This was especially illustrated in running the cross cut from the bottom of the winze in the California mine about 120 feet below the 1550-foot level, where the body was found to be about 25 feet in width of low-grade ore. Another thing you must understand is this: That in the line of Ophir, on the 1465-foot level, which is of the same depth as the 1640-foot level of California will be when opened, there is nothing; and in my opinion this is as deep as they will find pay ore in the California. Lastly; It has been apparent to every close observer of the manipulations of this market that Flood has been a persistent and steady seller of Consolidated Virginia and California whenever an opportunity was afforded him without breaking the market. It may be well to add in this connection that the general dulness in California trade is attributed to the universal mania for dealing in mining shares.

California.—The product of this mine for the fiscal month of April was over $1,600,000. The ores from this mine, says an exchange, are so rich as to create unexpected difficulties in their amalgamation. The north drift on the 1400-foot level is being extended to connect with the Ophir mine.

The Meadow Valley Mining Company has levied an assessment of $1 per share, amounting to $60,000, delinquent June 3d. This is the eleventh assessment, and makes a total of $1,350,000, against $1 200,000 paid in seventeen dividends. This assessment is for the purpose of putting in new machinery.

Julia Mine.—The main shaft on this mine is 1,820 feet deep, and is now the deepest vertical shaft on the Comstock lode.

The daily ore product of several leading mines is as follows:—

	Tons.
Consolidated Virginia	550
Belcher	450
California	250
Ophir	150
Chollar	90
Imperial	50
Empire Grass Valley	45

Mint Coinage.—The coinage operations of the San Francisco Mint for the month of April were $3,389,000, and for four months since January 1, $12,396,500. The treasure shipped from San Francisco to all points from January 1 to April 30 aggregated $4,603 553.

Colorado Stock Exchange.—Sales for the two weeks ending the 29th ult. were as follows:

Name.	Par.	Bid.	Ask.	Sales
Cash	$100	$....	$....	....
East Roe	10	....	8 00	205
Hercules and Seven-Thirty	10	5 00	....	50
Victoria	10	2 75	....	1720
Gold Hill	10	....	30	200
Phil Sheridan	10	1 25	....	410
Polar Star	10	....	4 00	2
Pleasant View	10	1 45	....	1280
Total Sales				3867

QUOTATIONS:

	No. of feet on Vein.	No. of shares.	May 4.	May 11.
Sierra Nevada	3,300	100,000	$16	$16
Union Consol'd	600	100,000	13	13
Mexican	600	108,000	31	33
Ophir	675	108,000	54	54
California	600	540,000	75	80
Consol'd. Virginia	710	540,000	71	74
Best & Belcher	540	100,800	57	55
Gould & Curry	612	100,800	18	17
Savage	771	112,000	16	17
Hale & Norcross	400	16,000	50	56
Chollar Potosi	1,400	28,000	81	82
Alpha Consol'd	306	30,000	46	47
Imperial Con	468	500,000	5	5
Yellow Jacket	957	120,000	26	28
Kentuck	95	30,000	12	12
Crown Point	541	100,000	16	16
Belcher	1,040	104,000	24	19
Overman	1,300	38,400	64	64
Caledonia	2,188	100,000	8	8
Justice	2,100	105,000	24	26
Raymond & Ely	5,000	30,000	14	14
Meadow Valley	4,400	60,000	1	1
Eureka Consolid	....	50,000	11	11
Eureka G. V	1,680	20,000	3	3
Silver Hill	5,400	54,000	8	8
Julia	3,000	110,000	11	11

Copper Stocks.

Specially reported by Messrs. Wilson W. Fay & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

Boston, Thursday Evening, May 11, 1876.

The market on coppers rule dull, and generally lower. There has been an assessment of $5 per share levied on the Allouez, payable June 1st, to stockholders of record, May 15. Calumet and Hecla has declined to 166 sales. Copper Falls, 1¾ bid. There has been an assessment levied on the Copper Falls of $2 per share, payable May 25, with interest thereafter, of 7 per cent., to stockholders of record, May 15. Franklin is lower, at 11½ asked, being somewhat depressed by the decline in Allouez. Pewabic lower, $3@$3½. 21 is bid for Osceola. Quincy is the strongest stock on the list, at 45 bid. Nothing doing in small coppers.

Copper Products.—The following reporting mines have handed in their yield for the month of April:

	Tons.	Lb.
Calumet and Hecla	1,132	1,685
Quincy	130	1,020
Franklin, 91 tons 1,000 lb. / Pewabic, 30 tons 1 100 lb.	122	100

Description.	Par Value.	No. of Shares.	Closing. Bid.	Asked.
Allouez	$50	20,000	$7 00	$9 00
Calumet and Hecla	25	80,000	166 00	166 50
Central	25	20,000	30 50	31 00
Copper Falls	50	20,000	1 25	1 75
Dana	25	20,000	8	10
Franklin	25	20,000	11 00	11 50
Humboldt	25	20,000	9	11
Madisca	25	20,000	27	30
Mesnard	25	20,000	50	60
Minnesota	25	20,000	1 50	1 75
National	25	20,000	1 50	2 00
Osceola	25	40,000	21 00	22 00
Petherick	25	20,000	55	60
Pewabic	25	20,000	3 00	3 50
Phenix	25	20,000	12 00	13 00
Quincy	25	20,000	45 00	45 50
Ridge	25	20,000	5 00	5 25
Rockland	25	20,000	20	30
International Silver	20	60,000	12½	15
Star*	25	20,000	51	55
Superior	25	20,000	10	15
Duncan Silver	20	60,000	1 25	1 37½

* Assessment paid.

Gas Stocks.

New York, Friday Evening, May 12, 1876.

Gas stocks are somewhat firmer, and holders evince less disposition to press their stocks on the market. We change but few of our quotations, and those principally to higher figures.

The Metropolitan Gas Company of Brooklyn, has declared a dividend of 2¼ per cent., payable May 20th.

Mutual Gas Company.—The annual meeting of this company, will be held on the 16th inst.

Citizens Gas Company of Newark, N. J.—In the suit against this company for balance due on contract for Gibson Valves, the jury found a verdict against the company for $4,257.

Montreal Gas Company.—We note recent sales of 287 shares of this stock, at from 167½ to 168 per share.

Washington, D. C., Gas Company.—60 shares of this stock, $10 paid, were sold at auction in Philadelphia during the week, at $30.50 per share.

Lynn, Mass., Gas Company.—20 shares have sold during the week, at from 86½ to 87 per share.

Cambridge, Mass., Gas Company—We are reported small transactions in this stock at $135 per share.

Springfield, Mass., Gas Company.—This company is deliberating on the feasibility of applying automatic extinguishers to the street lamps, we take the following description of the instrument, from the Springfield *Union:*

"It appears outwardly like a large hunter-cased watch, placed just below the burner, the pipe apparently passing through it. Inside is a thin leathern diaphram against which the pressure of the gas, be it more or less is exerted in passing to the burner. The least movement of the diaphram is communicated to a trigger releasing a weighted lever, and, this closing a valve instantly shuts off the gas from that burner. A set screw adjusts the trigger spring, once for all, to the pressure at which it is wished to put the light. Supposing then that it is desired to darken any portion of the city at a given hour in the night, all that is necessary is to provide these extinguishers, adjusted to the pressure to be maintained after that hour. Turning of the valve at the gas office till the guage indicates that pressure will put out every one of them instantaneously, while all the rest burn on. The expense of these extinguishers is about $3 per lamp, they are water and dust proof, and appear to be a sure thing. In a recent test at Brightwood, at an appointed time the valve at the gas works some two miles away was slightly turned. In two minutes the little instrument noted the change in the pressure, the weight fell and the light was extinguished."

The following list of Companies in New York and vicinity are corrected weekly by George H. Prentiss, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Quotations "bid" and "asked" of New York City and Vicinity Gas Companies are on the $100 of stock and not on one share.

Companies in New York and Vicinity.	Cap. Stk.	Par.	last Divid.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.	$5,000,000	$ 100	2½	Jan. '76	108½	110
" " Bonds	900,00	1,000	†3½	Feb. '76	105	
NewYork, "	4,000,000		5	Jan. '76	130	136
Metropol. "	2,500,000	100	5	Mar. '76		150
" " Certf.	1,000,000	....	3½	"	102	103¾
" " Bonds	500,000	1,000	3½	Jan. "	105	
Harlem "	1.850,000	50	4	Feb. '76	118	122
Manhattan "	4,000,000	50	10	Jan. "	255	260
Brooklyn, B'klyn	2,000,000	25	5	Nov. '75	190	200
Nassau "	1,000,000	20	4	Jan. '76	90	95
" " Certf.	700,000	1,000	3½	Nov. '76	95	98
People's "	1,000,000	10	3½	Jan. '76	60	70
" " Certf.	300,000	1,000	3½	Jan. '76	82½	86
" " Bds	325,000	....	3½	Feb. "		95
Metropol. "	1,000,000	10	3½	Nov. '75	70	75
Wmsburgh "	1,000,000	50	5	Jan. '76	120	125
" " Certf.	1,000,000	....	3½	Jan. "	98	100
Citizen's "	1,200,000	20	2½	Jan. '76	95	100
" " Certf.	320,000	1,000	3½	April "	99	101
J. C. N.J.	386,000	20	5	July, '75	160	170
Centl. Westch. N.Y.	466,000	50	4	July. "	95	100

† Gold.

Companies out of Town.*	Cap. Stk.	Par	Bid	Askd.
People's " " of J. C.			120	‡33
¶Citizen's G. L. Co., New'k. N.J.	1,095,000	50	85	90
Hempstead " " L. I., N.Y.	40,000	100		103
Jamaica, " " "	25,000	100		103
Richmond Co., S. I. "	300,000		100	105
Citizens', Rochester, "		100	60	63
Rochester Gas Co., "		100	50	
‖People's G. L. Co. Albany, "	1,000,000	100		40
§Mutual " Buffalo "	750,000	100	40	50
Mutual " Detroit Mich.		50	18	
TroyG. L. Co., Troy, N. Y.			108	
Brockport, N. Y., G. L. Co.	25,000	100	60	80
†Baltimore G. L. Co., Balt., Md	2,000,000	100	185	
St. Louis G. L. Co., St. Louis, Mo	600,000		110	130
People's G. L. Co., Balt., Md	2,000,000	25	25	25½
Hannibal G. L. Co., Hanni., Mo.	100,000	100	95	100
La Clede, St. Louis, Mo	1,200,1100	100	110	115
Lewiston G. L. Co., Lewis., Me	400,000	100	50	85
Chicago G. L. Co., Chicago, Ill.	2,000,000	100	125⅛	
Jacksonville, Ill.	120,000	100	80	
‡Lima, Ohio.	60,000	100	10	
Derby G. L. Co., Derby, Conn.	160,000	100	60	80
Woonskt G. L. Co. Woonskt, R.I.	150,000	100	100	
Fort Wayne G. L. Co. F. W., Ind		100	90	100
North. LibertiesG. L. Co. Phila.		25	29	
Wilkes-Barre G. L. Co W. B. Pa.		50	70	
Washington G. L. Co., Phila.			42	43
Pottsville, Pa., Gas Co.		50	40⅛	
Portland G. L. Co. Portland, Me	350,000	50	72	75
Hartford G. L. Co., Hartford, Ct	700,000	25	42	
Boston G. L. Co., Boston, Mass.	2,500,000	500	785	790
East Boston, Mass		25	132	
Chelsea G. L. Co. Chelsea, "	300,000		139	
Cambridge G. L. Co., Cam., "	700,000		134¾	
Louisville G. L. Co., Louis., Ky.			127	
Cincinnati G. L. Co, Cincin, O.				200
Carondelet G. L. Co., Mo		50		6¼
S. F. G. L. Co. San Francisco, Cal	10,000,000	100	99¼	99¾
Stillwater G. L. Co., Minn.	50,000	50		26
City G. L. Co. Montreal, Can.	1,440,000	40	167½	168
Consumers G. L (old,) Tor., Ont	600,000	50	133	
Hamilton G. L. Co., Ont.	150,000	40	112½	
Halifax G. L. Co., Halifax, N.S.	400,000	40	143	148

* These quotations represent the latest obtainable prices at which sales were made.

† This Company has issued $1,000,000 in certificates in addition to their stock indebtedness, on which they pay interest at the rate of 6 per cent. gold.

‡ This Company has $30,000 in bonds outstanding.

§ $200,000 represents the bonded indebtedness of this Company.

‖ $350,000 of the indebtedness of this company is represented by bonds.

¶ $124,000 of the indebtedness of this company is represented by bonds; also $53,000 in certificates, which is included in the aggregate stock debt quoted.

AMERICAN INSTITUTE OF MINING ENGINEERS.

The third volume of Transactions of the Institute has been mailed to all members and associates elected prior to the February meeting. Prompt notification is requested in cases where the volume has not been received.

Foreign members of the Institute may obtain the volume by remittance of five dollars to the Secretary.

Copies of Volumes I. and II. may be had of the Secretary for five dollars each.

THOMAS M. DROWN, Secretary,
Lafayette College, Easton, Pa.

MARCH 8th, 1876.

RAILWAY GUIDES.

Everybody going to the Centennial Exhibition should provide themselves with a railway guide for the journey. The best one to purchase is either the TRAVELERS' OFFICIAL GUIDE, containing all the through time-tables and list of railway officers, sold at 50 cents per copy, or the pocket edition of the same, called OFFICIAL TIME-TABLES, price 25 cents. With the last-named they can ascertain the population of all the cities they pass through, and their principal business interests, etc. It also contains a fine lithographic map of Philadelphia, showing the Centennial Buildings. Both are issued by the

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The Value of Coal Lands.
The Rates of Wages paid to Miners for a number of Years.
The Cost of Mining.
The Combination Rules governing the Anthracite Coal Trade.
The Coal Tonnage of the principal Coal-carrying Roads and Canals.
The Rates of Freight charged.
The Distances from the Coal Fields to the principal Markets.
Imports and Exports of Coal.

FOREIGN COAL.—The Coal Area, Number and Thickness of Coal Beds of all Foreign Countries.
The Amount of Coal mined from the earliest Times in all Coal-producing Countries.
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Its subscribers comprise nearly all the proprietors, managers, and agents of collieries and ironworks in the United Kingdom, and include also a very large proportion of the upper class of officials entrusted with the management of the various departments of coal mining and iron making. It also circulates largely amongst gentlemen engaged in scientific pursuits and in the various branches of manufacture and commerce.

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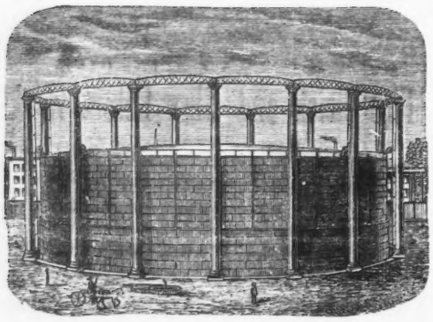

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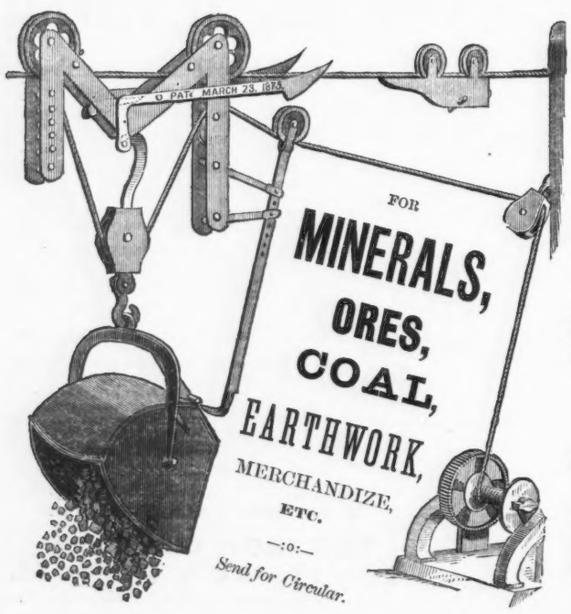

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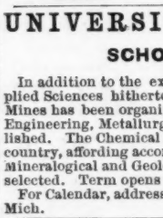

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